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1861
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JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

BOTANY.

VOL. V.

LONDON:
SOLD AT THE SOCIETY'S APARTMENTS, BURLINGTON HOUSE;
AND BY
LONGMAN, GREEN, LONGMANS AND ROBERTS,
AND
WILLIAMS AND NORGATE.
1861

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

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OF THE

LINNEAN SOCIETY OF LONDON.

On *Fropiera*, a new Mauritian Genus of Calycifloral Exogens, of doubtful affinity. By J. D. Hooker, Esq., M.D., F.R.S., F.L.S.

[Read June 16th, 1859.]

In a letter lately received by Sir William Hooker from M. Bouton in the Mauritius, that gentleman announces the despatch of specimens of a remarkable plant, which he is unable to refer to any genus, and which, if new, he desires should be published, and bear the name of the Hon. Mr. Fropier, Member of the Legislative Council of the Mauritius, and a liberal and zealous promoter of science. On the arrival of the specimens, they proved to be specifically identical with a plant of which there are two specimens in the Hookerian Herbarium,—one in an indeterminable state, and referred to *Memecylon* by its sender, Prof. Bojer; the other, also in bad condition, collected by Sieber (Fl. Maurit. ii. no. 123). This latter I had already examined, and, being unable to determine its affinities, had placed it amongst the Plantæ Dubiæ of the Herbarium. An analysis of the specimens sent by M. Bouton have enabled me to draw up a complete character of it, but not to indicate its nearest affinity with any certainty.

The habit of *Fropiera* is very much that of some *Ilicineæ*; and the pure-white bark (of the branches) and foliage resemble, very closely indeed, those of *Leucodermis*, in the same family with which genus, however, *Fropiera* has no other character in common. The dotted leaves and sepals, close-set parallel veins, intramarginal

vein, and entire coriaceous leaves very greatly resemble those of a *Eugenia* and other *Myrtaceæ*; but its superior fruit entirely removes it from that Order. Upon the whole, I am disposed to regard it as an anomalous ally of *Myrtaceæ*, but do not place any confidence in this conclusion. The structure of the flower and fruit is remarkably simple, and presents no salient characters of any kind.

FROPIERA, *Bouton, MSS.*

Calyx 5-fidus. *Petala* 5. *Stamina* 10, disco perigyno inserta, filamentis subulatis æstivat. subincurvis, antheris oblongis. *Ovarium* liberum, 3-gonum, 3-loculare, stylo brevi, stigmate trilobo. *Ovula* ∞, placentis axillaribus affixa. *Bacca* globosa, calycis basi suffulta, stylo persistente terminata, 3-locularis. *Semina* ∞, exalbuminosa, minima; testa crustacea, profunde cancellata; embryone ovoideo, carnoso, oleoso; cotyledonibus plano-convexis, radicula magna obtusa.—Arbuscula Mauritiana; ramis *teretibus, ramulorum cortice albo*; foliis *alternis, exstipulatis, coriaceis, integerrimis, pellucido-punctatis, margine incrassatis*; floribus *parvis, pedicellatis, fasciculatis, vel in racemos breves axillares dispositis, ebracteolatis.*

FROPIERA MAURITIANA, *Bouton, MSS.*

Hab. Sylvis montanis Insulæ Mauritius, *Carmichael, Sieber, Bojer, Bouton.* Nom. vern.: "Bois sans écorce."

Arbuscula 20-pedalis, ramis teretibus cortice lævi rufo, ramulis lignosis cortice albo. *Folia* 2–4″ long., $1\frac{1}{4}$–2″ lat., coriacea; *lamina* supra lucida, subtus pallida, costa margineque sicco rufescentibus; venis utrinque junioribus inconspicuis parallelis, intramarginali margini proxima; petiolo brevi $\frac{1}{6}$″ long. robusto. *Flores* vix $\frac{1}{5}$″ expans., pedicellis $\frac{1}{4}$–$\frac{1}{2}$″ long. *Calycis* lobi breves, rotundati. *Petala* parva, sessilia, late orbiculata, coriacea, pellucido-punctata, breviter unguiculata. *Stamina* brevia, filamentis post anthesin elongatis recurvis; antherarum loculis 2 parallelis, dorso intruso affixis, rimis latis dehiscentibus. *Pollen* . . . . . *Ovarium* sessile, trigonum, stylo brevi trifido. *Bacca* subpedicellata, grosse punctata, $\frac{1}{2}$″ diam.; stylo brevi; stigmate late discoideo, 3-lobo. *Placentæ* bifidæ, lobis divaricatis. *Semina* atra, minima. *Embryo* pallide flavus, mollis.

Tab. I. fig. 1, bud; 2, flower; 3, calyx and ovary; 4, transverse section of ditto; 5, transverse section of fruit; 6, seed; 7, embryo. All *magnified.*

On the mode of branching of some Amazon trees. By RICHARD SPRUCE, Esq. Communicated by G. BENTHAM, Esq., V.P.L.S.

[Read February 2nd, 1860.]

I SHALL not readily forget the impression caused by the first view of the eastern margin of that vast forest, in which I wandered for eight years before reaching its western verge. For thirty-two days we had seen only sky and ocean, when, towards evening of the 9th of July, 1849, we sighted the Brazilian coast, some distance South of the delta of the Amazon. On the following day, when the morning mist cleared away, a long unbroken shore lay extended before us, which every one on board declared to be steep cliffs of earth furrowed by the rains, but which a telescopic view revealed to be lofty forest springing from the water's edge, the trunks of the trees representing what we had mistaken for rain-furrows. As we ran along shore and gradually lessened our distance, I endeavoured to trace out the species composing the forest; but, with the exception of the palms, of the trees with bipinnate foliage, and of a few with remarkable dome-shaped crowns, there was such an intermingling of forms that I in vain attempted to separate them; nor was there, among exogenous trees, any contour so striking as the twisted pyramid of our Northern pines. When I, shortly afterwards, entered the forest, the confusion was still greater; for so much were the branches of adjacent trees interwoven, and so densely veiled in many cases with twiners and epiphytes, that only an indistinct view could be obtained of any individual tree, and it was only when sailing along the banks of the rivers that I saw so much of the trees, which grow in the inundated forest, as to give me a clear idea of the outlines and general aspect of many of them. In this way I gradually came to distinguish many families and genera by their habit; and though I knew that what we vaguely term "habit" must depend on the disposition, form, and colour of the leaves and branches, and is therefore capable of definition, I did not begin to analyse my impressions until, after eighteen months' travel, I reached the mouth of the Rio Negro, and was forcibly struck by the paraboloidal form of the nutmeg-trees which abound there. A closer examination showed this outline to depend on the regularly 5-nate branches, extending horizontally, and pinnately branched in the same plane, the lowest or oldest branches being the longest, thence gradually diminishing in length to the apex of the tree. Very symmetrical examples of this structure are afforded by two

undescribed *Myristicæ*—*M. hypoleuca*, Plant. Amaz. 3206, and *M. calophylla*, Pl. Am. 3207, found growing side by side on the Casiquiare. Both species have the branches in whorls of five; but in the former the branches are bipinnate, and in the latter simply pinnate, with large leaves, 16 inches long. A similar verticillate ramification obtains in all the species of *Myristica*. Sometimes two of the branches in each whorl are more slender than the other three, as if later developed; more rarely one or two members of the whorl are absent. But in *M. debilis*, Pl. Am. (Rio Uaupés), an arbuscule from 3 to 10 feet high, and with a stem scarcely thicker than the finger, the simple branches are placed in whorls of three. This is the only instance of so extremely humble growth among American Nutmegs, most of the species being timber-trees, and some of them, such as *M. fatua*, Sw., and *M. rugulosa*, Pl. Am., reaching 80 or 100 feet in height.

A very remarkable modification of the usual habit exists in a *Myristica* observed (though not gathered) on the shores of the Amazon, above the Rio Negro, in which the 5-nate branches are abruptly bent upwards, about midway, into a nearly vertical direction. This is one of the very few trees on the Amazon which remain without leaves for a few weeks in the year; and when I first saw it (in July 1851), the naked branches had a very singular appearance, more resembling pothooks than anything else; but when I ascended the Amazon to Peru (in March 1855), the tree was in full foliage, and the view I obtained through my glass, of the distichous coriaceous subligulate leaves, left no doubt on my mind that it was a species of *Myristica*. Perhaps the peculiarity in its ramification was produced by the branches flowering at the apex (contrary to the habit of the other species) and emitting an innovation, at nearly a right angle, from below the inflorescence.

What I saw in the *Myristicæ* caused me to pay more attention to the mode of branching in other trees; but I encountered difficulties in the prosecution of my observations, not easily appreciated by those who have seen trees only in temperate climes. Except near the banks of the rivers, it was rarely possible to ascertain from beneath the mode of branching of any tree; and when cut down, the branches were often so crushed together, and so hidden by the ruins of adjacent smaller trees, which were fastened by stout lianas to the larger tree and had thus become involved in its destruction, that it was impossible to trace their disposition, especially as the ants, wasps, and snakes, set in angry motion by

the smash, often obliged me to beat a retreat before I had time even to gather the number of specimens I needed.

In the allied family of Laurels an approach to whorled branching is occasionally seen; and in two species the branches are exactly verticillate. In a *Lauracea* gathered near Tarapoto (Pl. Am. 5884), the branches grow in whorls of five; and an *Oreodaphne* (Pl. Am. 3081) from the Rio Negro has the branches in threes, exactly as in *Myristica debilis*. This *Oreodaphne* has the stem from 12 to 20 feet long, no thicker than the finger, and decidedly twining among the adjacent bushes, in which respect it shows a curious approach to *Cassytha*.

In a species of *Persea* cultivated at Tarapoto for the sake of its fruit, the branches are approximated, usually in fives (whereof three are frequently stouter than the rest), so that at a distance they appear whorled; for though the branches in each cluster are from 1 inch to 3 inches apart, the clusters themselves are 2 feet or more asunder. In most *Lauraceæ*, however, the branches are obscurely or not at all whorled, and they ascend at various angles; so that it is rare to see, among trees of this family, any approach to the symmetrical contour of the *Myristicæ*.

Another family, *Monimiacea*, whose affinity to *Myristiceæ* in structure and aromatic properties is sufficiently obvious, shows also some correspondence in its mode of branching. In one species, *Citrosma myristicoidea* (Pl. Am. 4907), the branches are 5-nate, exactly as in the *Myristicæ*. In another *Citrosma* (Pl. Am. 3965), the young plant bears a whorl of five branches at the apex, below which is produced a vertical innovation, bearing at its summit a similar whorl, and so on; so that what may be called a verticillato-proliferous ramification is generated. Some approach to one or other of these modes of branching is traceable in all the species of *Citrosma* known to me.

The *Anonaceæ*, with much affinity to *Myristiceæ*, and a very similar habit, have also pinnate branches and coriaceous distichous leaves; but the branches are solitary, not whorled. In the *Guatteriæ*, where the branches usually vary in direction, the tree takes an irregular form; but in some *Xylopiæ*, where the branches are parallel and nearly horizontal, the trees do not differ much in form from the *Myristicæ*: generally they are more pointed (pyramidal) than the latter, whose symmetrical crown is more or less rounded at the apex. *Xylopia Spruceana*, Bth. Pl. Am., from the Casiquiare, a tree of from 20 to 50 feet high, remarkable for its cedar-like aspect, has the branches elongate, pinnate, sometimes slightly

depressed below the horizontal line, the long ramuli densely clad towards the apex with dark-green leaves along with axillary flowers. *X. salicifolia*, Dun. (Orinoco), with very similar habit, has much paler, softer leaves. *X. parviflora*, Pl. Am. 3678 (San Carlos), the most beautiful of the genus, grows 60 feet high, and has a dense pyramidal head of four times pinnate branches. *X. grandiflora*, St. Hil., is abundant at the cataracts of the Orinoco, and is probably the *Unona* seen there by Humboldt, who remarked its straight branches and pyramidal outline, which features, however, are less marked than in the species above-cited.

Two other families, *Bombaceæ* and *Tiliaceæ*, bearing nearly the same relation to each other as *Myristiceæ* and *Anonaceæ*, are often distinguished by precisely the same difference in the ramification; the branches being whorled in the former, and solitary in the latter. The large *Eriodendra* of the Amazon, called "Samaüma" by the natives, are remarkable for their regularly dome-shaped crown, approaching to, but generally less than, a hemisphere. When on the lower Amazon, where these trees most abound, I had not begun to note critically the modes of branching; and I have never seen a large *Eriodendron* prostrate. Their normal ramification, so far as I could ascertain it from below, seems to be this: primary branches horizontal, 5-nate (but often with two or three additional branches of more recent date to lower whorls), bipinnate; secondary branches horizontal; ramuli ascending. When the lofty *Eriodendron* of the gapó (*E. Samauma*, Mart. ?) is without leaves, its round crown, towering above the rest of the forest, is a beautiful object if projected on some thunder-cloud at the back, the tracery of its branches assuming a delicate pink colour.

A species of *Ochroma* (one of the "Palos de balsa," or raft-wood trees*), frequent near the Huallaga, has the primary branches 5-nate, exactly as in *Myristica*; but the secondary branches are also 4–5-nate, and (as might be inferred) the leaves are not distichous; so that, though the contour is nearly the same as in *Myristica*, the crown has not the regularly imbricated appearance which is produced in that genus by all the branches and leaves being extended in parallel horizontal planes.

In many *Tiliaceæ*, especially in *Mollia* and the allied genera,

* The raft-wood trees of the Rio Negro and Casiquiare are *Apocyneæ*, species of *Malouetia*. On the Trombetas a species of *Plumiera* (*P. Mulongo*, Bth.) serves the same purpose. Bamboos and the thick petioles of the large *Mauritias* are also common materials for rafts throughout Amazonland.

which have the branches horizontal and pinnate, the leaves subligulate, and the inflorescence axillary, there is a strong general resemblance to *Anonaceæ*; and a notable example is *Tiliacea*, Pl. Am. 4595, a tree of 60 feet, abundant in the gapó of the Huallaga and Marañon, which has the branches very slightly ascending and bipinnate.

Mabea, an Euphorbiaceous genus, abundant in the forests of the Amazon, but rare elsewhere, has verticillato-proliferous ramification, very much on the same plan as *Citrosma*, Pl. Am. 3765. *Mabea Maynensis*, Pl. Am. 4888, the only species of this genus I have noted in the Andes, at the head of a valley near Tarapoto, I find thus described in my notes:—"Arbuscula tenuis, 12–20-pedalis, prolifero-ramosa, sc. apice ramos 3 (raro 4) elongatos simplices v. subpinnatos proferens, dein infra verticillum innovans et denuo apice verticillatim ramosa," &c. But *Mabea*, 1324, a plant of the same genus from Barra, has as many as twelve branches in a whorl.

The pines and firs of temperate and frigid climes offer still more striking examples of a whorled ramification combined with a pyramidal or dome-shaped crown. The only tree allied to this group, I have hitherto seen in S. America, is a *Podocarpus* (Pl. Am. 5519) which I found growing in the Valley of Pangor, on the western slope of the cordillera, some distance south of Chimborazo, at a height of 12,000 feet. This tree has the stem and primary branches verticillato-ramose, branches numerous, mostly indefinite, not all of equal size nor exactly in the same plane; secondary branches simple, or subpinnately branched, rarely with whorled ramuli.

It is not often that we find examples of solitary and verticillate branching in the same Order; and I know of but one instance of the two modes coexisting in the same genus,—namely, in *Diospyros*, of which four Amazon species, viz. *D. longifolia*, Pl. Am., *D. glomerata*, Pl. Am., *D. polyandra*, Pl. Am., and Pl. Am. 4411 (Tarapoto), have the branches in whorls of five (very rarely three or four); and three species, viz. *D. Pöppigiana* DC., Pl. Am. 3138 (San Carlos), and Pl. Am. 3159 (Casiquiare), have solitary alternate branches. The former group, besides the Myristicoid habit, differs from typical *Diospyros* in the polyandrous flowers and the corolla, so deeply cloven that its five or six laciniæ seem distinct petals; the latter, corresponding to *Diospyros* proper, has oligandrous flowers and the corolla tubular or hypocrateriform, with a short 4-5-lobed limb. The differences in habit and character of

the two groups are so decided, that, should the few polyandrous *Diospyri* found in other parts of the world possess the same verticillate ramification as the Amazon species, I should be disposed to place them in a genus distinct from *Diospyros*.

Macreightia myristicoidea, Pl. Am. (Uaupés), another Ebenaceous plant, has the branches in whorls of three, and has a very similar habit to that of *Myristica debilis*, which grows along with it.

Many *Artocarpeæ* show a tendency to a whorled ramification. In *Cecropia* the normal ramification seems to be thus: branches in fives, each branch ending in three ramuli, or, if the division is carried further, the innermost ramulus is the main one; so that the branches are whorled, and then trichotomous. There is sometimes a suppression of one, two, or three branches in the primary whorls, and of one of the ramuli in the fascicles: and very often the branches of a whorl do not spring exactly at the same height on the stem; but as they are always within a few inches of each other, while the whorls are several feet apart, the verticillate character is distinctly preserved.

Having considered some of the more remarkable cases of pyramidal or paraboloidal outline, where the crown of a tree from a broad base tapers gradually to the summit, let us consider the opposite form, where the crown has a broad flat or subconvex summit, and tapers gradually downwards to the insertion of the lowest branch, *i. e.* approaches to obconical or obpyramidal. The most perfect examples of this mode are found in trees with opposite leaves and terminal inflorescence; and there is none more notable on the Amazon than the Mulatto-tree (*Enkylista Spruceana*, Benth.), a tree 80 to 100 feet high, frequent all along the banks, and whose polished brown trunk and narrow obconical top mark it out to view among the adjacent trees. If we examine young specimens of this tree, or of many *Psychotriæ*, *Cephaelides*, &c., we shall find the first flowers to be borne in a cyme at the apex of the primary axis. From beneath the cyme proceed two opposite and equal branches, which, in their turn, bear each a cyme at the apex and a pair of branches below it. Thus a regularly dichotomous ramification is generated, and the growth of the tree is continued along a number of equal independent axes, whose number is being continually augmented; for observation enables us to lay down this axiom: that *when any axis, whether principal or partial, flowers at its apex, its upward growth is completed*; it may increase in bulk by the addition of tissue to its length and breadth, but not by prolongation from an apical bud. Exceptions to this law are only so

in appearance: there are, for instance, several Apocyneous trees in which the inflorescence seems terminal, but has always above it an apical leafy bud, conspicuous enough in some *Plumieræ*, often very obscure in certain *Tabernæmontanæ*, but not the less actually existing, and in consequence of whose presence the thick closely scarred ramuli go on lengthening from year to year. In the dichotomous ramification above-described, if the pairs of branches contain an acute angle, the crown of the tree may be regularly obconical and flat-topped; but if the angle be divergent, the crown will probably be more or less convex, and may even be reniform.

In trees with alternate leaves and terminal inflorescence a dichotomous ramification may equally exist; but, as in this case one of the two branches originates lower on the stem than the other, one axis in each of the resulting pairs of axes will be stouter than the other. To take an instance in the genus *Ricinus*, of which one species multiplies abundantly in waste ground near Tarapoto, and is known to the inhabitants of Maynas by the name of "Higuerilla colorada" (its seeds affording the oil with which they feed their lamps), young plants of this *Ricinus* have simple stems, which, in three months after the germination of the seed, attain a height of 6–8 feet, and flower at the apex. From the axils of each of the two uppermost leaves (very nearly contiguous, though still visibly alternate) springs a branch in which the growth of the plant is continued, the growth of the main axis ceasing with the flowers which terminate it. The branches in their turn produce flowers and branchlets at the apex, as the stem did; and thus a dichotomous ramification is generated and continued through many subdivisions, till the plant becomes a stout little tree 25 feet high, with a flat or subconvex top.

An example of dichotomous ramification and almost flat top is afforded by *Panax Morototoni*, Aubl. ("Morototô" of the Brazilians), a tree abounding all along the Amazon, and even among the roots of the Andes, whose white trunk and digitate leaves give it the aspect of a *Cecropia*. The nearly allied genus *Hedera* has frequently an isochotomous ramification; *H. resinosa*, Pl. Am., has in some plants a trichotomous, in others a 5-chotomous ramification; *H. maynensis*, Pl. Am. (Tarapoto), has the branches 4-nate.

In general, any isochotomous ramification may be considered to produce an obconical or corymbose outline in the plant*. Instances

* Though I apply the term "isochotomous" to fasciculate branching, where the branches spring several together from the same point and always at the same angle, it should be understood that the ultimate branches are often fewer

of this mode may be naturally looked for in plants with whorled leaves and terminal inflorescence; and the branches in each fascicle will often be fewer than the leaves in each whorl. In *Rauwolfia*, an Apocyneous genus which has the leaves 4–5-nate, the ramification is regularly 3-chotomous, of which *R. polyphylla*, Benth., *Rauwolfia* Pl. Am. 1732, and *R.* Pl. Am. 3856 are examples. But there are numerous cases of isochotomous ramification in trees with alternate leaves, as, for instance, in most species of *Croton*,—though the trees of this genus which produce the South American "dragon's-blood" show a combination of verticillate and isochotomous branching, the trunk or primary axis being continuous or excurrent, and the secondary axes deliquescent: so the general outline is still conical, though the branches are fan-shaped (for they are isochotomously divided in the same horizontal plane). A good example of this is a beautiful *Croton* (Pl. Am. 4582—the "Sangre de drago" of Maynas) gathered at Tarapoto. This is a straight tree of 80 feet, with nearly black shining bark; the first branches are from three to six in each whorl (three stouter, and one to three slender supplementary branches alternating with the former and often inserted a few inches below them), and they are 3–6-chotomously divided. Several other *Euphorbiaceæ* resemble the *Crotons* in their isochotomous mode of branching. *Manihot Aypi* (the "Yuca dulce" of Maynas, whose nutritious and harmless root supplies the inhabitants with a moiety of their food, as the poisonous root of *M. utilissima* does the inhabitants of Brazil) has the stem four times trifid, the branches forming with each other nearly a right angle (80°–88°). In a wild species of *Manihot* from Tarapoto (Pl. Am. 4287) there is the same trichotomous ramification, and the long weak branches thread, almost twine, among the adjacent bushes.

Some *Ericeæ*, especially certain species of *Gaultheria* frequent in the Quitenian Andes, have a fasciculato-3–5-nate (nearly isochotomous) ramification.

The ramification of some species of *Theobroma* is partly verticillate and partly isochotomous. *Th. subincanum*, Mart. (Pl. Am.

together than the primary. This is analogous to what occurs in verticillate ramification, where the secondary or tertiary branches are frequently alternate. A little observation shows us that, as we proceed from the primary axis to the apices of the remote axes, *there is a tendency to a straightening out of the spiral*, in the insertion of both leaves and branches. This is well seen in several *Hypna*, where the leaves, 8-stichous on the stem, become 4-stichous or even distichous at the apices of slender elongated shoots.

1737) has a tall straight trunk, almost hidden under a mass of odoriferous flowers, and bearing at the apex a whorl of twice- or thrice-forked branches. If the stem be continued beyond this, it is by an innovation springing from below the whorl. In the same way, *Th. Cacao* is proliferous,—the stems (for it is usually multicaul) bearing an apical whorl of three dichotomous branches, then being continued in an innovation, which, in its turn bears a similar whorl, and so on. All this is very like what is above described as occurring in *Citrosma* and *Mabea*, but corresponds more closely with the branching of those species of *Cordia*, of which *C. umbraculifera* is the type. These *Cordiæ* have proliferous stems, and bear at each successive apex a whorl of spreading (often drooping) branches, which are 3–2-chotomously divided. In one Amazon species the flowers grow on the naked trunk, in another they are axillary on the ramuli, and in another terminal. In these two latter forms, the whorl of branches, after flowering, decays and usually falls along with the ripe fruit, leaving the stem naked and with its successive innovations resembling sticks tied on to one another at the ends. The chandelier-like appearance of the crown of branches has induced the Venezuelans to give the name of "Candeleros" to these *Cordiæ*. The French emigrants in Cayenne call them, with almost equal propriety, "Arbres parasols."

In some genera the branches are fascicled throughout, though variable in number in each fascicle, often unequal in size, and not springing from exactly the same point; and yet their effect on the habit and outline of the tree is the same as if the ramification were regularly isochotomous. *Neea*, *Terminalia*, and *Bucida* are branched after this fashion. In such cases the main growth of a branch is usually continued along the outermost ramulus of each fascicle; so that there is a continual recurvation of the secondary axes, quite comparable to what is observed in the scorpioid cymes of some *Tournefortiæ*, though less in degree. A most extraordinary form is often assumed by *Bucida angustifolia*, DC., a tree abounding on the sandy shore of the Rio Negro, where it exists for several months in the year with barely its head out of water. Its crown is a wide flat-topped reversed cone, and its short thick trunk puts forth under water an almost equal-sized cone of radicles; so that, when the retiring waters leave it bare on the shore, it looks at a distance like a gigantic hour-glass*!

* When I was at San Carlos del Rio Negro, and the famine grew sore in the land of the Barrés, as was but too frequently the case, I was in the habit of

It may be deduced from the foregoing examples, that where the primary ramification is isochotomous, what botanists call a determinate or deliquescent stem will result; and where it is verticillate, opposite or alternate, the stem will be indeterminate or excurrent. A proliferous stem may be considered an aggregate of annual determinate stems; and the "whorl" of branches in which each stem terminates is more properly a fascicle, corresponding to those of *Rauwolfia* or any other cymosely-branched plant.

There is a remarkable class of plants, not unfrequent in Amazon forests, with a simple stem continually lengthening at the apex, but normally never branched. An examination of their structure shows that *all the secondary axes are annual*; *i. e.* a flowering peduncle is produced in every leaf-axil. Trees of this class may truly be called palmiform; and some notable examples of it exist in *Cinchoneæ*, such as, for instance, *Remijia lacunosa*, Pl. Am. (Rio Negro and Uaupés), whose slender unbranched trunk, 40 feet high, is crowned by large leaves near 2 feet long, which give it at a distance the aspect of a small palm. The *Caricæ*, or Papaws, have a similar habit; and most of the species branch only by exception, as where, from some accidentally sterile axil (especially of the first leaves of the young plant), a branch is put forth after the lapse of perhaps several years, and then most likely adventitiously, as, for instance, in consequence of the breaking off of the leading shoot.

Melia Azedarach, the "Flor de Paraiso" of the Maynensians,

going down to Marabitanas, the frontier town of Brazil, to purchase pigs and rice. In returning from one of these visits (a distance of three days up stream in a small canoe), we were one day towards evening skirting the gapó, in which only the tree-tops were out of water, when, on the thick flat top of a *Bucida*, we saw an enormous water-snake (*Sucurijú*) coiled up and enjoying a quiet sleep. I instantly seized my gun to shoot it. "Stay," said the two Indians who rowed my canoe, "let us run the prow under the branches, so that when you shoot the snake, it may fall into the canoe." "Wait first to see whether I disable it," replied I; for the risk of such a process was obvious, and I knew not then, as I came to know afterwards, what expert snake-hunters these men were, nor that when a Barré Indian meets a large snake or a tiger, he thinks not of fleeing from it, but of eating it. So at ten paces' distance I put a charge of swan-shot into the monster: the blood spirted from the wound, and for some moments he did not stir; so I thought him dead, when he began slowly to uncoil and to descend towards the water. So thick-set were the branches, that I could not once get sight of his head, to give him the charge of the other barrel in that part, ere he reached the water and escaped, to the great disappointment of my companions, who had calculated on a savoury supper. I have seen one of these animals move off with four charges of shot in its body, though they are easily killed by a shot in the head.

a tree which has spread itself abundantly in equinoctial America, is either entirely unbranched, or only some of the first axils put forth branches, which go on lengthening at the point like the main stem, and producing flowers from every axil, till they resemble long wands with a bunch of leaves and flowers at the apex. On the Amazon the tree is in flower every day in the year. I know not if the same thing occurs in its native country, or whether it preserves there the same habit. The *Jacarandas* resemble the Azedarach in their mode of growth ; and there is one species frequent on the Amazon (but whose flowers I could never obtain) conspicuous for its palm-like habit, its tall unbranched stem, and crown of large decompound leaves.

In every mode of branching, the regularity of development and symmetry of outline may be disturbed by the occasional extension into a leafy branch of what should normally be a floriferous peduncle, and by the springing of branches from old leaf-axils or (more rarely) from any part of the surface of the stem.

It is unnecessary to call attention to the fact that, where plants are similar in other points of their structure, some correspondence in their mode of branching will be found to exist, and that the differences, where there are any, have ascertainable limits in every genus and order.

In trees, the connexion between the mode of branching and the nature of the inflorescence is generally traceable ; while in many herbaceous plants the peculiar mode of branching of the species is to be observed only in the inflorescence. Even in some arborescent plants the branching is obvious only in the peduncles, as in the palmiform trees above-described, in the curious Loganiaceous genus *Potalia*, and especially in a *Simarubea* (Pl. Am. 3888) from Maynas, with simple proliferous stems and immense terminal corymbs 4 feet across.

The branching of a peduncle may be considered in the same way, and reduced to the same laws, as the branching of a tree. The whole life of what might have been a large compound branch, with a secular duration, is contracted into the narrow dimensions and brief period requisite for perfecting the fruit, which renews the existence of the branch and of the species in distinct individuals. What are called *centripetal* inflorescences are contracted excurrent axes, as *centrifugal* inflorescences are contracted deliquescent axes. That flower always opens earliest whose pedicel is first developed or is placed lowest down the axis : so, if the flowers nearest the axis are the latest to open, it is because they are the youngest, and

the inflorescence is centripetal, as in a congested corymb, an umbel, or a capitulum, all of which are varieties of the contracted raceme; but when the youngest flowers are most remote from the axis, as in a cyme, the flowers nearest the axis will first open, and the inflorescence will be centrifugal.

Ambato, near Quito, May 25th, 1859.

On *Barteria*, a new Genus of *Passifloreæ* from the Niger River.

By J. D. Hooker, Esq., M.D., F.R.S., L.S. &c.

[Read June 16th, 1859.]

Amongst the many interesting plants collected by the lamented Mr. Barter during Dr. Baikie's present Niger expedition, is a very singular and new form of those anomalous *Passifloreæ* of which several genera have already been found in that quarter of the globe, and which I propose should bear the name of its intrepid and indefatigable discoverer, whose collections far exceed in magnitude, condition, and value those of any other explorer in those regions.

The affinity of *Barteria* with *Smeathmannia*, Br., is obvious; but it differs remarkably from that genus, and indeed from all others of its order, except *Crossostemma*, Planch., in the stigmas being consolidated into one large very indistinctly lobed terminal capitate mass, exceeding the ovary in diameter. The imperfect condition of the fruit sent does not enable me to determine its exact structure; but if, as appears to be the case, this is an indehiscent berry, it presents another important difference between *Barteria* and *Smeathmannia*.

From *Crossostemma*, also a native of West Tropical Africa, our plant differs in the very numerous stamens, inserted in two series, and in the nature of the corona.

Char. Gen.—*Calycis tubus* brevis, laciniis 5 lanceolatis acuminatis, imbricatis. *Petala* 5, sepalis conformia. *Corona* duplex: exterior erecta, membranacea, apice fimbriato-lacera; interior brevissima, incrassata, obscure crenata, os tubi calycis coronans. *Stamina* numerosa subbiserialia; filamentis filiformibus, basi in membranam fundo tubi calycis insertis connatis; antheris lineari-oblongis. *Ovarium* fundo calycis insertum, globosum, stylo valido, stigmate maximo conico-globoso basi intruso, placentis 3–4 parietalibus, ovulis numerosis. *Fructus* (bacca?) coriacea,

ovoidea ? ; seminibus compressis, testa crustacea grosse lacunosa. *Frutex* ramulis robustis ferrugineo-pubescentibus, utrinque linea elevata bases foliorum connectente notatis ; foliis alternis, brevipetiolatis, oblongis, subacutis, crenulatis integerrimisve, utrinque glabris ; petiolo crasso ; stipulis ? ; floribus majusculis ; axillis foliorum 2–4 subsessilibus, bracteis magnis imbricatis late ovatis acutis primo immersis ; calyce sericeo.

BARTERIA NIGRITANA.

Hab. **Ad ripas flum. Nun (ostium Nigritis), legit *beat. Barter.***

Frutex **robustus, habitu *Smeathmanniæ*; foliis 6–10″ long., 2–3″ lat., nervis primariis numerosis. *Stipulæ* deciduæ, non visæ. *Flores* sessiles, circiter 1–1½″ diametro, iis *Smeathmanniæ* subsimiles. *Bracteæ* numerosæ arcte imbricatæ, alabastrum maturum velantes, late ovatæ cuspidato-acuminatæ. *Petala* calyce paulo longiora. *Stamina* perplurima. *Ovarium* glaberrimum. *Fructus* magnit. *ovi columbæ*.**

Tab. II. fig. 1, flower with the bracts removed ; 2, flower laid open ; 3, stamen ; 4, transverse section of ovary ; 5, seed. All *magnified*.

On *Sphærocoma*, a new Genus of *Caryophylleæ*, from Aden in Arabia Felix. By THOMAS ANDERSON, Esq., M.D., F.L.S.

[Read March 1, 1860.]

MY attention was directed to this plant while examining the Hookerian Herbarium for materials for a Florula of Aden. As it has proved to be a new genus of *Caryophylleæ* possessing many points of interest, I have had a figure and dissections of it made for the Society's Journal.

Its distinct sepals, well-marked petals, and five almost perigynous stamens opposite the sepals, unilocular bi-ovulated ovary, with the placenta prolonged beyond the insertion of the ovules, place it in the tribe *Alsineæ*.

Forskål's genus *Gymnocarpos* is its nearest ally, and is very like it in habit ; but the two ovules and bifid stigma of *Sphærocoma* readily distinguish it from that genus. It resembles R. Brown's *Pteranthus* in the sterile flowers having accrescent calyces, forming in fruit setaceous heads ; but from the two genera *Cometes* and *Pteranthus*, forming that tribe, it differs in having the seta of the sepals undivided, as well as in the shape of the embryo, which is curved over the albumen in *Sphærocoma*, while in *Pteranthus* it is placed at one side.

It is evidently a rare plant, as it occurs in no collection except

the complete one made by Drs. Hooker and Thomson, at Aden, in 1847 & 1851.

CHAR. GEN.—*Calyx* 5-partitus, in fructu persistens, laciniis mucronatis ovatis marginibus serratis, florum sterilium demum longe setaceis. *Petala* 5, subhypogyna, fere perigyna, erecta, ovata, obtusa, persistentia. *Stamina* 5, dentibus annuli perigyni alterna, in annulum perigynum inserta. *Antheræ* biloculares, ovatæ. *Ovarium* uniloculare, biovulatum, placenta supra ovula elongata. *Stylus* brevis; stigma bifidum, lobis fimbriatis. *Utriculus* chartaceus, indehiscens, abortivo monospermus. *Semen* campylotropum subrotundum. *Embryo* curvatus albumen farinaceum includens.

Fruticulus *regionis aridæ Arabiæ Felicis* "Tehama" *dictæ, habitu* Gymnocarpidos, *exstipulatus*; *folia fasciculata, carnosa*; *glomeruli post anthesin in capitula setigera transformantes.*

SPHÆROCOMA HOOKERI.—Caule erecto lignoso ramoso, cortice glauco; foliis in nodis oppositis caulinis fasciculatis carnosis teretibus apice obtusis, basi attenuatis; glomerulis pedunculatis ebracteatis, floribus dense aggregatis; sepalis ovatis concavis mucronatis, florum sterilium linearibus, in fructu setaceis, setis integris; capsula calyce et corolla squamis persistentibus inclusa.

Fruticulus 2-pedalis, ramosus, glaberrimus, glaucus; caulis nodis oppositis foliosis. *Folia* 6–10‴. *Glomeruli* fusci 1–3‴, pedunculis 1–1½‴ erectis; bracteis 1–2 sepaloideis. *Utriculus* parvus, subchartaceus.

In the dried plant, many of the leaves seem as if their upper part was covered by a loose membranaceous calyptra. This appearance is evidently caused by the rapid drying of the more succulent upper portions of the leaves having occasioned a shrivelling of the epidermis, which becomes detached from the subjacent tissue.

Tab. III. fig. 1, leaf; 2, head of flowers; 3, flower; 4, the same laid open; 5, stamen; 6, pistil; 7, vertical, and 8, transverse section of ovary; 9, head of fruit; 10, sterile and fertile flowers; 11, utriculus; 12, seed; 13, vertical section of seed; 14, embryo.

All the figures, except 2 and 9, are more or less magnified.

On the value of Hairs, as a Character in determining the Limits of subordinate Groups of Species, considered in connexion with the Genera *Eurybia* (Cass.) and *Olearia* (Mönch), of Compositæ. By William Archer, Esq., F.L.S.

[Read March 1, 1860.]

My attention was first directed to the question of the value of hairs, in determining the differences between closely allied species, by a passage in one of Dr. Lindley's admirable botanical works, 'The Introduction to Botany;' and I have constantly made use of this character, often finding it of practical application, especially in separating dried specimens. For example, the distinction between *Cassinia aculeata* (Br.) and *Ozothamnus rosmarinifolius* (Br.) cannot otherwise be ascertained without an examination of the receptacles of the specimens; but they may be quickly separated by means of the hairs, those on the stem of the former plant being tomentose, while those on that of the latter are arachnoid.

Having perceived that much discussion had taken place as to the generic difference between *Eurybia* (Cass.) and *Olearia* (Mönch), I examined the species of both genera within my reach in Tasmania. The result was, that the hairs on the leaves of the (then) reputed *Oleariæ* (*O. lirata, fulvida,* and *Gunniana*) proved to be stellate, while those on the leaves of the reputed *Eurybiæ* (*E. argophylla, viscosa, alpina,* &c.) were T-formed. I afterwards found that other species of *Eurybia* had woolly hairs on the leaves, others glandular, and others, again, septate.

By the kindness and liberality (so well known and appreciated) of Sir William Hooker, who permitted me to study the whole of the species of *Olearia* and *Eurybia* contained in his unrivalled Herbarium, I was enabled to obtain all the information that I considered necessary to solve the difficulty before me.

However, I soon discovered that, if I were to go thoroughly into the subject, I should speedily be beguiled into *Diplopappus* and its allies, and should probably soon find myself deep in other genera, the very names of which were as yet unknown to me.

Therefore I determined to content myself, for the present, with a classification of all the species of *Olearia* and *Eurybia* (to the number of fifty-two) of which there were good suites of specimens, according to the form of the hairs on their leaves, and then ascertain how far the character derived from the hairs was supported

by those afforded by the other organs. The result will be found in the "Conspectus" which concludes this paper.

As to the question of the generic value of the character based upon the uniserial or biserial pappus, it is necessary first to determine the difference between the two,—a point which does not seem to have been satisfactorily decided. In *Eurybia* and *Olearia* there are two kinds of pappus, which appear at first sight equally biserial, but which, nevertheless, are found upon close examination to differ considerably. The one, which is styled "pappus duplex" in the following "Conspectus," has two distinct rings of hairs—the inner one composed of long, simple, scabrid bristles, and the outer of short, rather wide, subserratulate ones, more or less connate at the base. The other kind of pappus, which I have below called "subduplex," consists of one ring of long, simple, scabrid bristles, with a less and varying number of short ones of the same description disposed irregularly on the outside of them, in some measure alternating with them, and planted closely together with them at the base, but not by any means forming a distinct ring. It does not appear to differ, otherwise than in the shortness and nearly equal length of the bristles, from what is below styled "pappus inæqualis," the bristles of which are of very unequal length.

The following seven species have the pappus "duplex:"—

Hairs of leaves stellate.

Eurybia lirata (*DC.*).
—— fulvida (*Cass.*).
—— Gunniana (*DC.*).
Eurybia rugosa (*Muell.*).
—— asterotricha (*Muell.*).

Hairs of leaves divaricato-furcate.

Olearia rotundifolia (*DC.*).
Olearia dentata (*Mönch.*).

The following thirteen species have "subduplex" pappus.

Hairs of leaves T-*formed.*

Eurybia dentata (*Hook. fil.*).
Olearia insignis (*Hook. fil.*).
Olearia pannosa (*Hook.*).
—— ? grandiflora (*Hook. fil.*).

Hairs of leaves stellate.

Eurybia hygrophila (*DC.*).

Hairs of leaves woolly.

Olearia Colensoi (*Hook. fil.*).
—— Lyallii (*Hook. fil.*).
Olearia oporina (*Hook. fil.*).
—— angustifolia (*Hook. fil.*).

Eurybia ramulosa (*DC.*).	Eurybia lepidophylla (*Hook. fil.*).
—— floribunda (*Hook. fil.*).	—— xerophylla (*Muell.*).

Of the seven species with "duplex" pappus, the first four group naturally together. It is a question, by-the-by, whether the second and third are specifically distinct; they are characterized by paniculate or corymbose heads of middling size, short silky achenia, duplex reddish-white pappus, and rather large, flat, dentate, stellate-haired leaves. A good natural group is formed by *E. ramulosa* and the two following species: it is distinguished by small quasi-racemose heads, short silky achenia, subduplex albescent pappus, and very small, entire, revolute-margined, woolly-haired leaves. The best natural group, however, is that composed of *O. Colensoi* and the three following species, which would form a fair genus, and have large solitary or few heads, long villous achenia, subduplex rufescent pappus, and large, flat, denticulate, woolly-haired leaves. Of the other nine species, *O. rotundifolia* and *O. dentata* together might, perhaps, form the nucleus of a group, characterized by somewhat large corymbose (2–4) heads, middling-sized villous achenia, duplex rufescent or albescent pappus, and rather large, flat, dentate leaves, with divaricato-furcate hairs. Of the remaining seven species, *O. insignis* and *O. pannosa* might, for the present, occupy a position, together with *O. rotundifolia* and *O. dentata*, in a genus based upon *O. Colensoi.*

Without going further, I may be permitted to remark that, if the subdivision *Diplopappeæ* (DC.) should be retained, the above seven species with duplex pappus are as much entitled to be placed in it as many of the species of *Diplopappus* and *Diplostephium.*

It will be noticed that the hairs on almost all the pilose achenia are bifid at the apex; and I believe this will be found to be the case very extensively among the *Compositæ.*

I am not prepared at present to recommend a definite new arrangement of this portion of the division *Astereæ,* but consider myself quite justified in expressing the opinion that a re-arrangement of the genera is very much to be desired. It might probably be founded upon the inflorescence and the size of the capitula, the arrangement and colour of the pappus, the clothing, form, and size of the leaves, and the form and size of the achenia.

If my humble labours should be found to have contributed at all to the attainment of a satisfactory result, I shall deem myself amply rewarded.

EURYBIA (*Cass.*) CUM OLEARIA (*Mönch.*).

Subgenerum, sectionum, subsectionumque Conspectus.

§ I. DICEROTRICHA. *Foliorum pili T-formes, vel (in subsectione* D.) *divaricato-furcati.*

A. *Capitula* parva, corymbosa vel paniculata. *Achenia* brevia vel longa, glabra aut laxe (rarissime dense) pilosa; pilis apice bifidis, rarissime glandulosis vel T-formibus. *Pappus* rufescens, rare albidus, æqualis aut inæqualis, vel rarissime subduplex. *Folia* margine plana, sæpissime magna, lata.

a. *Pappus rufescens. Achenium pilosum vel glabrum.*

1. Achenium pilosum, rarissime (ut interdum in *E. argophylla*) glabratum. Folia lata ($1\frac{1}{2}$–3 ad 2–5 unc. longa).

α. Achenii pilis apice bifidis. Capitula minora.

1. E. argophylla (*Cass.*). (Pappus æqualis.)
2. E. nitida (*Hook. fil.*). (Pappus inæqualis.)
3. E. Cunninghamii (*Hook. fil.*). (Pappus inæqualis.)
4. E. dentata (*Hook. fil.*). (Pappus subduplex.)

β. Achenii pilis T-formibus.

5. E. megalophylla (*F. Muell.*). (Pappus inæqualis.)

2. Achenium glabrum, rarissime (ut in *E. viscosa*), ad apicem bifido-pilosum. Folia lata ($\frac{3}{8}$–$\frac{1}{2}$ ad 2–3 unc. longa).

6. E. viscosa (*Cass.*). (Pappus subæqualis.)
7. E. chrysophylla (*DC.*). (Pappus æqualis.)
8. E. erubescens (*DC.*). (Pappus inæqualis.)
9. E. myrsinoides (*Nees*). (Pappus inæqualis.)

b. *Pappus albidus. Achenium pilosum.*

1. Folia angusta (2–$3\frac{1}{2}$ unc. longa), marginibus subrecurvis.

α. Achenii pilis apice bifidis.

10. E. alpicola (*F. Muell.*). (Pappus æqualis.)

2. Folia latiora (2–$2\frac{1}{2}$ unc. longa), marginibus subplanis.

α. Achenii pilis glandulosis.

11. E. furfuracea (*DC.*). (Pappus valde inæqualis.)

B. *Capitula* parva, subverticillata. Achenia longitudine mediocria, pilosa; pilis apice bifidis et T-formibus, glandulosisve. *Pappus* rufescens, æqualis. *Folia* parvula, lata, margine plana, vel angusta, marginibus revolutis.

a. *Achenii pilis apice bifidis, paucisque commistis* T-*formibus. Folia margine plana, latissima* ($\frac{1}{4}$–$\frac{1}{2}$ *unc. longa*).

12. E. virgata (*Hook. fil.*).

b. *Achenii pilis glandulosis. Folia angusta* (⅛–¼ *unc. longa*), *marginibus revolutis.*

13. E. Solandri (*Hook. fil.*).

C. *Capitula* majuscula, terminalia vel axillaria, solitaria, vel rarissime (2–4) corymbosa. *Achenia* brevia, ad apicem pilosa; pilis T-formibus, infra glaberrima vel rarissime bifido-pilosa. *Pappus* rufescens, æqualis vel inæqualis. *Folia* parva, lata, margine plana, vel linearia, marginibus revolutis.

a. *Capitula solitaria, rarius* (*ut in* E. ledifolia) 1- 2-*cephalis.*

1. Achenium infra apicem glaberrimum. Pappus inæqualis.

α. Folia lata, margine plana (¼–½ ad ½–1 unc. longa).

14. E. alpina (*Hook. fil.*). (Capitula axillaria.)
15. E. obcordata (*Hook. fil.*). (Capitula terminalia.)

β. Folia linearia, marginibus revolutis (⅜–⅝ ad ¾–1¼ unc. longa).

16. E. pinifolia (*Hook. fil.*). (Capitula axillaria.)
17. E. ledifolia (*A. Cunn.*). („ „)

b. *Capitula* (2–4) *subcorymbosa.*

1. Achenium infra apicem sparse bifido-pilosum. Pappus æqualis.

α. Folia lata, margine plana (1½–3 unc. longa).

18. E. persoonioides (*DC.*). (Capitula terminalia.)

D. *Capitula* maxima, terminalia, solitaria, longissime pedunculata, vel rarissime (2–4) corymbosa; pedunculis brevibus longisve. *Achenia* brevia vel longa, villosa; pilis omnibus apice bifidis, paucisve rare commistis T-formibus. *Pappus* rufescens vel rarius plus minusve albidus, inæqualis aut subduplex, duplexve. *Folia* magna, lata, margine plana; pili divaricato-furcati.

a. *Pedunculi solitarii, longissimi* (4–9 *unc. longi*). *Flores magni. Pappus inæqualis subduplexve.*

1. Pappus inæqualis. Achenii pilis apice bifidis, paucisque commistis T-formibus. Folia lata (1–3 unc. longa). Ligulæ elongatæ.

α. Folia crassa.

19. O. pannosa (*Hook.*). (Pappus rufescens.)

β. Folia tenuia.

20. O.? grandiflora (*Hook. fil.*). (Pappus luteo-albidus.)

2. Pappus subduplex. Achenii pilis omnibus apice bifidis. Folia magna, latiuscula (3–5 unc. longa). Ligulæ breves.

21. O. insignis (*Hook. fil.*). (Pappus rufescens.)

b. *Pedunculi* (2–4) *subcorymbosi* (¾–3 *unc. longi*). *Flores parvi. Pappus valide duplex.*

1. Pappus valide duplex. Achenii pilis omnibus apice bifidis. Folia latissima (¾–2 unc. longa).

α. Pedunculi breves.

22. O. rotundifolia (*DC.*). (Pappus rufescens.)

β. Pedunculi longi. (Capitula minora.)

23. O. dentata (*Mönch.*). (Pappus albidus.)

§ II. ASTROTRICHA. *Foliorum pili stellati.*

A. *Capitula* submediocria, sæpissime corymbosa vel paniculata. *Achenia* brevia vel longa, pilosa, pilis apice bifidis; rarissime glabra. *Pappus* rufo-albidus vel albescens, duplex aut subduplex, vel inæqualis. *Folia* lata vel angusta, marginibus planis vel revolutis.

a. *Pappus valide duplex. Achenium sericeum.*

1. Capitula corymbosa vel paniculata. Flores disci flavi. Achenium breve.

α. Folia lata (¼–2 ad 2–5 unc. longa), marginibus planis. Pappus rufo-albidus.

24. E. (O.) lirata (*DC.*).
25. E. (O.) fulvida (*Cass.*).
26. E. (O.) Gunniana (*DC.*).

β. Folia lata (¾–2 unc. longa), marginibus revolutis. Pappus albescens.

27. E. (O.) rugosa (*F. Muell.*).

2. Capitula (majora) solitaria, terminalia. Flores disci cærulei! Achenium longum.

α. Folia angusta (½–1½ unc. longa), marginibus recurvis. Pappus albescens.

28. E. asterotricha (*F. Muell.*).

b. *Pappus subduplex inæqualisve, albescens. Achenium glabrum, vel omnino aut partim pilosum.*

1. Capitula corymbosa.

α. Folia angusta (1–1½ unc. longa), marginibus revolutis. Achenium breve, glabrum.

29. E. hygrophila (*DC.*). (Pappus subduplex.)

β. Folia lata (2–4 unc. longa), marginibus planis. Achenium longum, sericeum.

30. E. avicenniæfolia (*Hook. fil.*). (Pappus inæqualis.)

2. Capitula solitaria, lateralia, quasi racemosa.

a. Folia latissima ($\frac{1}{4}$–$\frac{3}{8}$ unc. longa), marginibus vix recurvis. Achenium longum, dimidio superiore pilosum.

31. E. nummulariæfolia (*Hook. fil.*). (Pappus vix inæqualis.)

§ III. Eriotricha. *Foliorum pili lanati.*

A. *Capitula* parva, solitaria, lateralia, plerumque plurima, sæpissime quasi racemosa. *Achenia* brevia, sericea; pilis apice bifidis. *Pappus* albidus, subduplex inæqualisve. *Folia* sæpissime parvula, integra, lata vel angusta, marginibus revolutis.

a. *Capitula subsessilia, vel ad apices ramulorum brevissimorum quasi racemosa.*

1. Ligulæ plus minusve longæ. Folia plerumque oblonga ($\frac{1}{10}$ ad $\frac{1}{4}$–$\frac{3}{4}$ unc. longa).

32. E. ramulosa (*DC.*). (Pappus subduplex.)
33. E. floribunda (*Hook. fil.*). (Pappus subduplex.)
34. E. lepidophylla (*DC.*). (Pappus subduplex.)
35. E. subspicata (*DC.*). (Pappus inæqualis.)
36. E. axillaris (*DC.*). (Pappus æqualis, vix rufescens.)

2. Ligulæ brevissimæ (*Brachyglossa*, DC.). Folia linearia ($\frac{1}{2}$–$\frac{3}{4}$ unc. longa).

37. E. linearifolia (*DC.*). (Pappus inæqualis.)

b. *Capitula ad apices ramulorum longiorum terminalia.*

a. Folia suboblonga ($\frac{1}{4}$–$\frac{3}{8}$ unc. longa).

38. E. pimeleoides (*DC.*). (Pappus inæqualis.)
39. E. muricata (*Steetz*). (Pappus valde inæqualis.)

B. *Capitula* magna, racemosa, aut rarius (2–4) subcorymbosa, vel solitaria, terminalia. *Achenia* longiuscula, sericea; pilis apice bifidis. *Pappus* subduplex, rufescens. *Folia* magna, coriacea, lata vel angusta, margine plana.

a. *Capitula racemosa; pedunculis nudis. Folia lata* (2–4 *ad* 3–5$\frac{1}{2}$ *unc. longa*), *marginibus subduplicato-dentatis.*

40. O. Colensoi (*Hook. fil.*).
41. O. Lyallii (*Hook. fil.*).

b. *Capitula* (2–4) *subcorymbosa vel solitaria, terminalia; pedunculis bracteatis.*

a. Folia angusta (2–4 unc. longa), marginibus minute undulato-dentatis.

42. O. oporina (*Hook. fil.*). (Capitula [2–4] subcorymbosa.)
43. O. angustifolia (*Hook. fil.*). (Capitula solitaria.)

§ IV. Adenotricha. *Folia viscosa, plerumque glanduloso-pilosa.*

A. *Capitula* mediocria, corymbosa vel solitaria, terminalia, rarissime paniculata vel axillaria. *Achenia* brevia, pilosa; pilis sæpissime apice bifidis. *Pappus* æqualis vel inæqualis, rufescens, rarius albidus. *Folia* parva, sæpissime angusta, marginibus planis vel revolutis.

a. *Capitula corymbosa vel paniculata.*

1. Achenium sericeum. Folia anguste linearia ($\frac{1}{4}$–1 ad $\frac{3}{4}$–1$\frac{1}{8}$ unc. longa), marginibus revolutis.

α. Pappus æqualis, albidus. Capitula corymbosa.

44. E. glandulosa (*DC.*).

β. Pappus inæqualis, rufescens. Capitula paniculata.

45. E. tenuifolia (*DC.*).

2. Achenium glandulosum. Folia linearia ($\frac{3}{4}$–1$\frac{1}{4}$ unc. longa), marginibus planis.

α. Pappus inæqualis, rufescens. Capitula corymbosa.

46. E. linifolia (*Hook. fil.*).

b. *Capitula terminalia et rare axillaria.*

1. Achenium villosum. Pappus inæqualis.

α. Folia lata ($\frac{3}{4}$–1$\frac{1}{4}$ unc. longa). Capitula 1–2, terminalia.

47. E. xerophylla (*F. Muell.*). (Pappus albidus.)

β. Folia angusta ($\frac{1}{2}$–1 unc. longa). Capitula solitaria, terminalia et axillaria, quasi racemosa.

48. E. decurrens (*DC.*). (Pappus rufescens.)

2. Achenium sericeum. Pappus æqualis.

α. Folia linearia ($\frac{1}{6}$–$\frac{1}{4}$ unc. longa). Capitula terminalia, solitaria.

49. E. ericoides (*Steetz*). (Pappus rufescens.)

§ V. Merismotricha. *Foliorum pili septati.*

A. *Capitula* magna, paniculata aut subcorymbosa, vel solitaria, terminalia. *Achenia* breviuscula, pilosa; pilis apice bifidis. *Pappus* inæqualis, rufescens. *Folia* parva, lata, margine plana, vel angusta, marginibus revolutis.

a. *Folia lata ($\frac{3}{4}$–1$\frac{3}{4}$ unc. longa), margine plana. Capitula paniculata; pedunculis* 1$\frac{1}{2}$–4 *unc. longis.*

50. E. rudis (*Benth.*).

b. *Folia angusta* ($\frac{1}{4}$–$\frac{3}{8}$ *ad* $\frac{1}{4}$–$\frac{3}{4}$ *unc. longa*), *marginibus revolutis.*

1. Capitula (4–7) subcorymbosa; pedunculis $\frac{1}{2}$–1 unc. longis.

51. E. paucidentata (*Steetz*).

2. Capitula solitaria; pedunculis 3–5 unc. longis.

52. E. ciliata (*Benth.*).

Note on the Species of *Nissolia*. By Asa Gray, M.D., F.M.L.S.

[Read March 15, 1860.]

In the 'Flora Brasiliensis,' Mr. Bentham has reduced the three species of *Nissolia* proper to one (the *N. fruticosa*, Jacq.), and in a foot-note has briefly characterized a second species, *N. platycarpa*, from Coulter's Mexican collection. The latter is, as I suppose, the plant which, before the fruit was known, I had described under the name of *Chætocalyx Wislizeni**, and afterwards, on receiving the fruit in Wright's second New Mexican collection, had still left in that genus, because the fruit of DeCandolle's genus (at least, of the original species) still remained unknown.

More recently, Dr. Torrey has described and figured another North Mexican species, nearly related to *C. Wislizeni*, but different in several particulars,—among others, in the calyx-teeth, unless these should vary here as they appear to do in *N. fruticosa*. The species then are:—

1. N. fruticosa, *Jacq.*; *Benth. in Fl. Brasil., Legum.*, p. 77, t. 19.

This is No. 194 of Fendler's Venezuelan collection, in fruit.

2. N. platycarpa, *Benth. l. c.* Calycis dentibus subulatis tubum subæquantibus; legumine plano longitudinaliter 1-costato, articulis quadratis distinctis, ala samaroidea rectiuscula articulis latiore et 2–3-plo longiore.

3. N. Wislizeni, *A. Gray*. Herbacea, puberula; foliolis rotundatis subreticulatis; calycis dentibus subulatis tubo brevioribus; staminibus diadelphis (9 et 1); legumine plano longitudinaliter 3–5-nervi, articulis quadratis oblongisve distinctis, ala samaroidea parvula sæpius recta articulis parum latiore.—*Chætocalyx Wislizeni*, Gray, Pl. Wright. i. p. 51, and ii. p. 45; Torr. Bot. Mex. Bound. p. 56, t. 18. f. 5–7.

* Although Dr. Gray is quite right in referring his *Chætocalyx Wislizeni* to *Nissolia*, it proves on comparison to be distinct from *N. platycarpa*, both in the venation of the pod and in the terminal wing, which is very much smaller. I have therefore inserted, above, a somewhat fuller diagnosis of my *N. platycarpa*. —G. Bentham.

4. N. Schottii, *A. Gray.* **Fere glabra; foliolis ovatis eximie setaceo-mucronatis; calycis dentibus setaceis tubo longioribus; staminibus inferne monadelphis, superne æqualiter diadelphis; legumine immaturo 2–3-articulato, ala samaroidea anguste oblonga recta breviore.**—*Chætocalyx Schottii,* Torr. Bot. Mex. Bound. p. 56, t. 18.

A list of plants observed or collected at Mogador and in its immediate environs during a few days' visit to the place in April 1859; with notes and observations. By the Rev. R. T. Lowe, M.A. Communicated by the Secretary.

[Read January 19th, 1860.]

A week's detention at Mogador, on the coast of Barbary, when returning from Lanzarote to England in the North African Company's Steamer, 'Warrior,' in the spring of the present year, induced naturally some comparison between the general aspect of the sea-coast vegetation in the neighbourhood and that of the Canary Islands and Madeira, in which I had been for some months previously resident; and although losing, by a casual attack of illness, three out of the six days spent on shore, I collected in the immediate environs, partly by my own exertions, and partly by the valuable help of kind acquaintances, a sufficient number, both of the plants and also of the land and sea mollusks, to support the conclusions formed on the spot by observation, and so, perhaps, to warrant an attempt to furnish some slight sketch of the general features of Mogadorian botany and malacology*.

For, beside the interest belonging to a place so little visited, and since the time of Broussonet so wholly unexplored by any naturalist, a peculiar importance is attached to a correct appreciation of the vegetable and zoological conditions of this part of the great African continent. Its intermediate position between the well-searched shores of Algeria in a northerly, and Senegal conchologically, or Sierra Leone botanically, in the opposite quarter of the same continent, no less than its proximity in a nearly easterly direction to Madeira, and in a north-easterly to the two easternmost islands of the Canarian group, Lanzarote and Fuerteventura, the former lying only one degree, and the two latter only two or three degrees south of its own parallel of latitude, mark it as a spot possessing special claims on the attention of naturalists,—bespeaking, I may hope, their favourable acceptance of any con-

* The enumeration of the shells here referred to will be found in the Zoological portion of the present volume.

tribution, however inconsiderable or imperfect, towards a correct appreciation of the general affinities of its animal or vegetable productions.

The first impression of the vegetation on the eye, at landing, is that of something quite peculiar, to the traveller arriving fresh from the Canaries or Madeira. It is completely European, *i.e.* Andalusian, or Spanish-European. There is not a Palm, a Banana, or a Cactus to be seen. The shrubby Canarian *Euphorbiaceæ* are equally wanting with the Madeiran shrubby *Compositæ, Labiatæ,* and *Cruciferæ,* or the Porto-Santan *Salsolaceæ,* in the immediate vicinity of the sea. The Arabian *Peganum Harmala,* L., supersedes them all on the sea-shore; and the general aspect is as remote from the luxuriant tropical richness of the neighbourhood of Funchal, and indeed of the sea-cliffs generally in Madeira—clothed with naturalized thickets of *Arundo Donax,* L., *Colocasia Antiquorum,* Schott, *Opuntia Tuna,* Mill., *Cassia bicapsularis,* L., *Pelargonium inquinans,* L., &c., and a host of indigenous *Compositæ, Crassulaceæ, Campanulaceæ, Labiatæ,* &c.—as it is from the rugged stern, dull-grey and black *Euphorbia*-clad rocks and cliffs of Canarian coast-scenery in general, as in particular from the bald, pale, glaring, shingly sea-coast hills and slopes of Grand Canary, or from the flat, bare, sun-baked red and yellow shores and plains of Lanzarote and Fuerteventura, devoid almost of any little patch or tinge of green. The entire absence of all trees near the coast is a feature common no less to Mogador and all the Canary Islands, than to Porto Santo and the Dezertas in the Madeiran. The low sandy hills, of uniform height, which, at the distance of a mile or two, skirt the flat belt of lower land bordering the sea, stretching parallel therewith, north and south, far as the eye can reach, are clothed, at first sparingly or partially, then more closely, with low thickets of Broom (*Retama monosperma,* L.) and Lentisk (*Pistacia Lentiscus,* L.), intermixed with a few dwarfed trees of *Argania,* or shrubs of *Rhamnus, Vitex, Ephedra, Clematis,* &c. In the bed of the river the most abundant and characteristic plants are the Oleander and Vitex; and in the stream itself I observed *Potamogeton,* Water-cresses, *Helosciadium,* &c.

The weeds, indeed, are all of the commonest European aspect. In the town an ordinary-looking white-flowered Chamomile (*Anacyclus clavatus,* Desf.), resembling several of the common English species of *Anthemis* or *Matricaria,* covers every neglected flat, house-top, or wall; and the streets, roads, and gardens offer nothing but the ordinary weeds of cultivated ground in Europe,

Madeira, or the Canaries. The only striking plant, to a European, a Madeiran, or Canarian botanist, is a bed of *Peganum Harmala*, L., covering a flat space of two or three acres at the back of the beach, on passing out of the south gate of the town.

The Retama and Lentisk thickets of the low coast-hills alone offer any resemblance to any parts of the Canarian Flora,—and this only to certain regions at an elevation of from 1000 to 2000 feet in Grand Canary (El Monte), and in the Island of Palma.

The lauriferous or ericaceous Madeiran and Canarian regions are entirely unrepresented.

An inspection of the following list will satisfy the inquirer that the general character of the Mogadorian Flora is decidedly Algerian. With the Canarian Flora, except in the usual universal weeds, it has nothing in common of general, and very little of particular features; with Madeira, as with the tropical regions further down the coast, Sierra Leone, &c., it has absolutely nothing.

Specimens of nearly all the plants here enumerated have been placed in the Hookerian Herbarium at Kew, and in the Banksian Herbarium at the British Museum in London; and I desire to record my obligations to my friends Sir W. J. Hooker and J. J. Bennett, Esq., for the facilities afforded in the verification of their names.

The letters a, b, c, m, appended to any species, denote its occurrence also in Algeria, Britain, the Canaries, and Madeira. Desfontaine's 'Flora Atlantica' and Babington's 'Manual' have been my chief authorities for the two former; my own observations and Webb and Berthelot's 'Phytographia Canariensis' for the two latter habitats.

Phænogamous Plants observed or collected in the environs of Mogador, April 25th to April 27th, 1859.

DICOTYLEDONS.

Ranunculaceæ.

	Hab.
Clematis cirrhosa, *L.*, var *β*, *DC.*	a
Delphinium macropetalum, *DC.*	Mogador.

Papaveraceæ.

Papaver Rhœas, *L.*	a b c m
—— setigerum, *DC.*	c m

Fumariaceæ.

5. Fumaria agraria, *Lag.*	Spain.
Ceratocapnos umbrosa, *Dr.*	Palestine.

CRUCIFERÆ.

No.	Species	Hab.
	Matthiola tristis, *R. Br.*	a c
	Cheiranthus semperflorens, *Schousb.*	Mogador.
	Nasturtium officinale, *R. Br.*	a b c m
10.	Brassica? fruticulosa, *Cyr.*, *DC.*?	
	Sinapis alba, *L.*	a b c m
	Koniga libyca, *R. Br.*	c

RESEDACEÆ.

No.	Species	Hab.
	Reseda suffruticulosa, *L.*	a? b

CISTACEÆ.

No.	Species	Hab.
	Cistus salvifolius, *L.*	a
15.	Helianthemum thymifolium (*L.*)	a

VIOLACEÆ.

No.	Species	Hab.
	Viola arborescens, *L.*, var. γ serratifolia, *DC.*	a

TAMARISCACEÆ.

No.	Species	Hab.
	Tamarix gallica, *L.*	a b c m

FRANKENIACEÆ 0

CARYOPHYLLACEÆ.

No.	Species	Hab.
	Spergularia rubra (*L.*)	a b c m
	—— marina (*Roth*)	a b c
20.	—— procumbens (*Vahl*)	c
	Stellaria media (*L.*)	a b c m
	Cerastium triviale, *Link*	a b c m

MALVACEÆ.

No.	Species	Hab.
	Lavatera sylvestris, *Brot.*	Port., a c m
	Malva parviflora, *L.*	a b c m

HYPERICACEÆ 0

AMPELIDACEÆ.

No.	Species	Hab.
25.	Vitis vinifera, *L.*	a c m

GERANIACEÆ.

No.	Species	Hab.
	Erodium chium (*L.*)	a c m

LINACEÆ.

No.	Species	Hab.
	Linum tenue, *Desf.*	a

TROPÆOLACEÆ.

No.	Species	Hab.
	Tropæolum majus, *L.*	c m

OXALIDACEÆ 0

ZYGOPHYLLACEÆ.

No.	Species	Hab.
	Fagonia cretica, *L.*	a c

		Hab.
	RUTACEÆ.	
30.	Ruta angustifolia, *Pers.*	a
	Peganum Harmala, *L.*	a
	RHAMNACEÆ.	
	Rhamnus Alaternus, *L.*	a
	TEREBINTHACEÆ.	
	Pistacia Lentiscus, *L.*	a c
	Rhus oxyacantha, *Schousb.*	a
	LEGUMINOSÆ.	
35.	Genista gibraltarica, *DC.*	a
	Cytisus arboreus (*Desf.*)	a
	Retama monosperma (*L.*)	a c
	Pedrosia arenaria (*Brot.*)	Port., a? c?
	Trifolium procumbens, *L.*	a b c m
40.	Melilotus parviflora, *Desf.*	a c m
	Medicago denticulata, *Willd.*	a b c m
	—— littoralis, *Rohde*	a c
	Ononis Natrix, *L.*, var. β, *DC.*	a c
	—— angustissima, *Lam.*	c
45.	—— laxiflora, *Desf.*	a c
	Colutea arborescens, *L.*	a
	Ceratonia Siliqua, *L.*	a c m
	ROSACEÆ 0	
	GRANATACEÆ.	
	Punica Granatum, *L.*	a c m
	ONAGRACEÆ.	
	Epilobium hirsutum, *L.*?	b
	LYTHRACEÆ.	
50.	Lythrum flexuosum, *Lag.*	Spain, a c m
	MYRTACEÆ 0	
	CUCURBITACEÆ.	
	Bryonia alba, *L.*	a
	PORTULACACEÆ.	
	Portulaca oleracea, *L.*	a c m
	PARONYCHIACEÆ.	
	Paronychia argentea, *Lam.*	a c
	Polycarpon tetraphyllum, *L.*	a b c m
	CRASSULACEÆ.	
55.	Umbilicus hispidus (*Lam.*)	a
	—— pendulinus, *DC.*	a b c m
	Sedum reflexum, *L.*, β glaucum, *Koch.*	a b

		Hab.
	Mesembryanthemaceæ	0
	Cactaceæ	0
	Saxifragaceæ	0
	Umbelliferæ.	
	Eryngium ——?	
	Helosciadium nodiflorum (*L.*)	a b c m
60.	Ammi majus, *L.*	a c m
	Bupleurum canescens, *Schousb.?*	a?
	Daucus maximus, *Desf.*	a c
	Torilis nodosa (*L.*)	a b c m
	Caprifoliaceæ.	
	Lonicera Periclymenum, *L.*	a b
	Rubiaceæ.	
65.	Rubia peregrina, *L.*, β longifolia	a b? c
	Dipsaceæ.	
	Scabiosa Columbaria, *L.*	a b
	Valerianaceæ.	
	Valeriana Phu, *L.*	a
	Compositæ.	
	(*Corymbiferæ.*)	
	Erigeron ambiguus (*DC.*)	c
	Nolletia chrysocomoides (*Desf.*)	a
70.	Phagnalon rupestre (*L.*)	a c
	Inula viscosa (*L.*)	a c
	Asteriscus odorus (*Schousb.*)	a c
	Anacyclus clavatus (*Desf.*), *a*, *β*	a c
	Kleinia articulata (*L.*)?	
75.	Senecio crassifolius, *Willd.*	a c
	Calendula arvensis, *L.*	a c m
	(*Cynarocephalæ.*)	
	Centaurea aspera, *L.*	a
	Carduus macrocephalus (*Desf.*)	a
	—— tenuiflorus, *Curt.*	a b c m
80.	Scolymus hispanicus, *L.*	a c
	(*Cichoriaceæ.*)	
	Hedypnois cretica (*L.*)	a c m
	—— arenaria (*Schousb.*)	a c
	Tolpis barbata, *L.*	a c
	—— crinita, *Lowe*	a c m
85.	Picridium vulgare, *Desf.*	a c
	Sonchus tenerrimus, *L.*	a
	—— oleraceus, *L.*, β glandulosus, *Gaud.*, *Bab.*	a b c m

		Hab.
	CAMPANULACEÆ 0	
	VACCINIACEÆ 0	
	ERICACEÆ 0	
	PRIMULACEÆ.	
	Anagallis arvensis, *L.*, β cœrulea	a b c m
	—— collina, *Schousb.*	a
90.	Samolus Valerandi, *L.*	a b c m
	MYRSINACEÆ...... 0	
	SAPOTACEÆ.	
	Argania Sideroxylon, *Roem. & Sch.*	
	AQUIFOLIACEÆ 0	
	OLEACEÆ.	
	Olea europæa, *L.*, *a* Oleaster, *DC.*; β sativa, *DC.*	a c m
	Phillyrea media, *L. & DC.*	a
	—— angustifolia, *L.*?	a
	JASMINACEÆ.	
95.	Jasminum fruticans, *L.*	a
	APOCYNACEÆ.	
	Nerium Oleander, *L.*	a
	ASCLEPIADACEÆ.	
	Periploca lævigata, *Ait.*	a c
	GENTIANACEÆ.	
	Erythræa Centaurium (*L.*)	a b c
	—— spicata, *L.*	a c
	CONVOLVULACEÆ 0	
	BORRAGINACEÆ.	
100.	Cerinthe major, *L.*	a
	Echium maritimum, *Willd.*?	
	SOLANACEÆ.	
	Solanum humile, *Bernh.*	a c
	Lycium barbarum, *L.*	a c
	Datura Stramonium, *L.*	a b c m
	SCROPHULARIACEÆ.	
105.	Verbascum sinuatum, *L.*	a c
	Celsia cretica, *L.*	a c
	Linaria heterophylla (*Schousb.*).............	a c
	—— purpurea (*L.*)........................	a
	Scrophularia lævigata, *Vahl*	a

		Hab.
110.	Scrophularia canina, *L.*	a
	Veronica Anagallis, *L.*	a b c m

OROBANCHACEÆ 0

ACANTHACEÆ 0

VERBENACEÆ.

	Verbena supina, *L.?*	a c
	—— officinalis, *L.*	a b c m
	Vitex Agnus castus, *L.*	a

LABIATÆ.

115.	Lavandula Stœchas, *L.*	a c
	—— multifida, *L.*	a
	Mentha sylvestris, *L.*; ε nemorosa, *DC.* (δ *Sm.*)	a b c
	Thymus Broussonetii, *Boiss.*	Mogador
	Salvia clandestina, *L.*	a c m
120.	Nepeta Apulei, *Ucr.*	a
	Ballota nigra, *L.?*	a b c m
	Prasium majus, *L.*	a c m
	Teucrium Polium, *L.*; ζ angustifolium, *DC.*	a
	Ajuga Iva, *L.*	a c m

PLUMBAGINACEÆ.

125.	Statice sinuata, *L.*	a
	—— mucronata, *L. fil.*	a

PLANTAGINACEÆ.

	Plantago major, *L.*, γ intermedia, *Dcne. in DC.*	a b c m
	—— decumbens, *Forsk.*	a c m
	—— Lagopus, *L.*	a c m
130.	—— lusitanica, *L.*	a c
	—— Coronopus, *L.*	a b c m
	—— Psyllium, *L.*	a c m

AMARANTHACEÆ.

	Amaranthus Blitum, *L.*	a b c m

PHYTOLACCACEÆ.

	Pircunia dioica (*L.*)	a c m

SALSOLACEÆ.

135.	Beta vulgaris, *L.*, β. maritima, *Moq.*	a b c m
	Chenopodium murale, *L.*	a b c m
	—— album, *L.*	a b c m
	—— ambrosioides, *L.*	a c m

POLYGONACEÆ.

	Emex spinosus (*L.*)	a c m

		Hab.
140.	Rumex conglomeratus, *Murr.*	a b c m
	Polygonum maritimum, *L.*	a b c m

LAURACEÆ 0

THYMELÆACEÆ 0

ELÆAGNACEÆ 0

SANTALACEÆ 0

ARISTOLOCHIACEÆ.

	Aristolochia glauca, *Desf.*	a

EUPHORBIACEÆ.

	Euphorbia pubescens, *Vahl.*	a c
	—— heterophylla, *Desf.*	a c m
145.	Ricinus communis, *L.*	a c m
	Mercurialis annua, *L.*	a b c m

URTICACEÆ.

	Urtica urens, *L.*	a b c m
	Parietaria diffusa, *Koch.*	a b c m

AMENTACEÆ.

	Populus alba, *L.*	a b c m

CONIFERÆ.

150.	Thuja articulata, *Desf.*	a

GNETACEÆ.

	Ephedra fragilis, *Desf.*	a

MONOCOTYLEDONS.

ORCHIDACEÆ......... 0

CANNACEÆ 0

MUSACEÆ 0

IRIDACEÆ 0

AMARYLLIDACEÆ 0

TAMNACEÆ 0

SMILACEÆ.

	Smilax aspera, *L.*	S. Europe
	Ruscus Hypophyllum, *L.*, β *Lowe*	a m

ASPARAGACEÆ.

	Asparagus Pastorianus, *Webb*	c
155.	—— fœniculaceus, *Lowe*	

		Hab.
	LILIACEÆ v. ASPHODELACEÆ.	
	Asphodelus fistulosus, *L.*	a c m
	—— ramosus, *L.*	a c
	Scilla hæmorrhoidalis, *Webb.*?	
	PALMACEÆ.	
	Phœnix dactylifera, *L.*	a c m
160.	Chamærops humilis, *L.*	a m
	JUNCACEÆ.	
	Juncus acutus, *L.*	a b c m
	—— bufonius, *L.*; β fasciculatus, *Koch.*	a b c m
	AROIDACEÆ...... 0	
	POTAMOGETONACEÆ.	
	Potamogeton natans, *L.*?	
	CYPERACEÆ.	
	Cyperus rotundus, *L.*?	
	GRAMINACEÆ.	
165.	Andropogon hirtus, *L.*	a c m
	Cynodon Dactylon (*L.*)	a b c m
	Stipa tortilis, *Desf.*	a c m
	Piptatherum multiflorum (*Cav.*)	a c m
	Agrostis stolonifera, *L.*	a b c m
170.	Lagurus ovatus, *L.*	a b c m
	Polypogon monspeliensis (*L.*)	a b c m
	Schismus calycinus (*L.*)	a c m
	Poa annua, *L.*	a b c m
	Festuca sciuroides, *Roth.*	a b c m
175.	Bromus madritensis, *L.*	a b c m
	Hordeum murinum, *L.*	a b c m
	Lolium perenne, *L.*	a b c m

It appears that, of the 177 species above enumerated, the largest proportion, viz. 44 or $\frac{1}{4}$, are weeds common to Mogador, Algeria, Britain, the Canary Islands, and Madeira.

2. The next largest proportion, viz. 38 or $\frac{2}{9}$, is that of plants common to Mogador and Algeria.

3. The next, viz. 30 or $\frac{1}{6}$, is that of plants common to Mogador, Algeria, the Canary Islands, and Madeira; and this proportion is the same for (4) plants common to Mogador, Algeria, and the Canaries.

Thus, the general preponderance is, 1st, and vastly most, towards Algeria; 2ndly, towards the Canary Islands; 3rdly, towards

Madeira, in correspondence with the geographical position of the place.

In confirmation of this last deduction, it appears, so far as may be concluded from this list, that whilst Mogador has 37 or 38 plants in common with Algeria alone, it has only 4 or 5 peculiarly Canarian, and not one peculiar Madeiran plant.

The relative numbers or proportions of species in the different families or orders range as follows :—

Compositæ 20, or about $\frac{1}{9}$.
Leguminosæ 13, or about $\frac{1}{14}$.
Graminaceæ the same.
Labiatæ 10, or $\frac{1}{17}$.
Scrophulariaceæ 7, or about $\frac{1}{25}$.
Cruciferæ, *Umbelliferæ*, } 6, or about $\frac{1}{30}$.

Of single genera, *Plantago* has the greatest number of species.

In the foregoing list the names of several unrepresented orders, belonging to the Canarian and Madeiran Floras, are inserted for the mere sake of comparison.

Notes on particular species in the preceding list.

No. 2. *Delphinium macropetalum*, DC. Syst. i. 350; Prodr. i. 53.—Flowers full, rather than deep, blue. Ovaries 3. Two lower petals stipitate, the limb orbicular-obovate, and gradually attenuated at the base into its stalk.

The habitat "circa Mogador, Broussonet," ascribed by De Candolle in the former of the works above quoted to his *D. macropetalum*, agrees no less than his description with my plant, which I found commonly in waste garden-ground or cornfields up the river, three or four miles from Mogador. It seems to differ scarcely, even varietally, from *D. junceum*, DC. = *D. peregrinum*, Desf. i. 426?; Sibth. Fl. Gr. t. 506; Reichenb. Ic. Fl. Germ. iii. t. 68. f. 4672 (not Linn.!). It has perhaps, however, more the lax spreading or straggling habit of *D. Consolida*, L., though the main stem is erect.

5. *Fumaria agraria*, Lag. (not Koch.).—Habit of *F. officinalis*, L., but larger, with stouter stiffer stems. Fl. rather large, 4–6 lines long, full rose-purple tipped with black; sep. ovate toothed $\frac{1}{3}$ length of cor. Fr. large, distinctly verruculate, orbicular compressed, strongly carinate, with a distinct broad compressed short truncate or slightly notched beak.

This agrees exactly with *F. agraria*, Lag., of the Hookerian

Herbarium at Kew, but not with Koch's description of his *F. agraria*, Lag. (Syn. Ed. ii. 1017): differing in the broadly apiculate fruit, not "obtuse, notched with a crenule." I had therefore at first referred the Mogador plant to *F. Wirtgeni*, Koch; but a specimen of this from Wirtgen himself in the Hook. Herb. is assuredly nothing but *F. muralis*, Sond.

6. *Ceratocapnos umbrosa*, Drege.

This very elegant and graceful little plant, with its delicate thread-like stems, fine foliage, pretty fl., and highly curious fr., is very abundant, climbing over low bushes, at a spot called "the Emperor's Garden," two or three miles up the river. The rose or rose-purple flowers tipped with black are rather large proportionately. Pods very peculiar, at first horn-shaped with a slender beak curved towards the tip; afterwards short, corrugate.

10. "*Brassica? fruticulosa*, Cyr.," DC.?—Possibly a starved example of this plant, resembling *Sinapis radicata*, Desf. ii. 98. t. 167, in its pods, and in its hispid stem and rootleaves.

13. *Reseda suffruticulosa*, L.; Bab. Man. (Ed. 4) p. 35; Engl. Bot. Suppl. t. 2628.—Apparently perennial, or at least biennial. Stem shrubby at base. Abundant near Mogador.

16. This is *Viola suberosa*, Desf. ii. 313, corrected into *V. arborea*, L. (sic), in his table of emendations at the end of the volume.

20. *Spergularia procumbens* (Vahl.)=*Alsine procumbens*, W. B. Phyt. i. 149.—Cespitose. Fl. pale pink or rose. Styles 3. Abundant on the lofty sea-cliffs above the Salinas at the N. end of Lanzarote.

25. The vine is but sparingly cultivated.

30. *Ruta angustifolia*, Pers.—This is the true fine-leaved plant of Reichenb. Ic. Bot. viii. t. 788, f. 1062, agreeing also perfectly with Spanish examples in Herb. Hook. from Bourgeau. The plant has a pleasant, not too powerful, fragrance or aroma, totally different from the strong fetid smell of the Canarian and Madeiran *R. bracteosa*, DC. Stems slender virgate elongate; foliage green, not glaucous.

32. *Rhamnus Alaternus*, L.—A low bush. Not in fl. or fr.

33. *Pistacia Lentiscus*, L.—Very abundant on the low hills up the river. A bushy shrub 4–6 feet high, as in Grand Canary and in Palma.

34. *Rhus Oxyacantha*, Schousb.—Not in fl. or fr., but sufficiently characterized by its glaucous-grey foliage and want of spines.

35. *Genista gibraltarica*, DC.—Whole plant dark green, and appearing leafless. Not in fl. or fr.

36. *Cytisus arboreus*, Desf.—Not in fl.; and though probably the plant of Desfontaines, yet much resembling in habit, pods, and foliage *Genista candicans*, L.

37. *Retama monosperma* (L.); *Genista monosperma*, Lam., DC. ii. 150; *Spartium monospermum*, L., Curt. Bot. Mag. t. 683; Desf. ii. 130.—Forming thickets 6–8 feet high on the hills up the river. An apparently leafless shrub of a pale dull green colour, with long fascicled drooping slender branches, and fragrant small white fl. with a dark purple base or calyx. Pod short, inflated, hard, of a yellowish, horny and subpellucid appearance. Seed at first yellow, finally dark coffee-brown.

38. *Pedrosia arenaria* (Brot.), *Lotus arenarius*, Brot., DC.—Style distinctly bifid, as long ago correctly stated by Brotero in Fl. Lusit. ii. 120, 121. Webb, in W. B. Phyt. ii. 82, enumerates *L. arenarius*, Brot., as a Canarian plant; but the specimens from Bourgeau, under this name in the Hookerian Herb. at Kew, from "Palma prope Fuencaliente" belong rather to *L. holosericeus*, Webb, and are at least not the present plant.

41. *Medicago denticulata*, Willd.—Whole plant smooth. Pods solitary or in pairs, 4–5-whorled, smooth, with long spines hooked at tip.

42. *Medicago littoralis*, Rohde.—Pods smaller than in *M. Helix*, Willd., *i. e.* only two lines in diam., and with their marginal spines bent vertically up and down, instead of horizontal. It is a rather common Canarian species.

43. *Ononis Natrix*, β, DC. Prodr. ii. 159.—This is also *O. Natrix*, β, *picta* of W. B. Phyt. ii. 22, having the standard streaked with dark lines. It seems to be also *O. picta*, Desf. ii. 144, t. 187.

44. *Ononis angustissima*, Lam.—See W. B. Phyt. ii. 23, 24, where *O. longifolia*, Willd., is also quoted as a synonym. Compare also *O. gibraltarica*, Boiss., which has, however, fragrant flowers. My Mogador examples are unfortunately not sufficiently complete or numerous to be quite free from doubt as to their exact determination. They agree, however, perfectly with Webb's plant in their long linear leaflets.

45. *Ononis laxiflora*, Desf.—Fl. lilac. *O. pendula*, Desf., and *O. Broussonetii*, DC., are probably mere states or varieties of this.

49. *Epilobium hirsutum*, L.?—At the Emperor's garden, on the margin of a streamlet. Not in flower, but quite resembling the common English plant.

50. *Lythrum flexuosum*, Lag. = *L. Græfferi*, Ten. = *L. junceum*, Sol., Lowe, = *L. hyssopifolium*, Desf. (not Linn.).

55. *Umbilicus hispidus* (Lam.), DC. iii. 399; *Cotyledon hispida*, Desf. i. 359.—A small Sedum-like plant 2-4 inches high, with rather conspicuous handsome blush or pale pink flowers, large in proportion, smooth obtuse fleshy roundish tapering leaves, and with the branches of cyme, pedicels, and calyx pubescent.

57. *Sedum reflexum*, L., β Koch.—Not seen in flower, but perfectly resembling *S. glaucum*, Sm. Engl. Bot. t. 2477.

58. *Eryngium* —— ?—The species indeterminable, owing to the young state of the specimen. Desfontaines enumerates no less than 8 Algerian species.

61. *Bupleurum canescens*, Schousb. ?—The specimens not being in flower or fruit, and having the leaves distinctly 5-nerved instead of many-nerved, as they are, according to DC. iv. 133, in Schousboe's Mogadorian plant, may possibly belong to some other shrubby species of the genus. They agree, however, better with the diagnosis of *B. canescens*, Schousb., than with that of any other species recorded by Desfontaines or DeCandolle.

62. *Daucus maximus*, Desf. i. 241; DC. iv. 212.—Fl. white or flesh-coloured; central (abortive) fl. purplish-black. Segments of leaves mucronate, ovate in the lower, linear-oblong or lanceolate in the upper leaves. Differs from *D. hispidus*, Desf., (1) in the *larger* white or flesh-coloured (not "pallide flavi") radiant flowers; (2) in the distinctly mucronate acute (not "obtuse") ultimate laciniæ or segments of the leaves; (3) in the much larger general bracts or involucres, which are as long as the primary rays of the umbel. It differs again from *D. parviflorus*, Desf., in (1) and (3), and further in the close crowded umbel. Its nearest ally is undoubtedly *D. Carota*, L., as observed by Desfontaines; and it also very much resembles, if it is not identical with, a plant which I found abundantly in Teneriffe, especially at Souzal, half way between Laguna and Orotava, but with which I am unable at the moment to compare it. Yet Webb in his Phytogr. mentions only two Canarian species, *D. parviflorus* and *D. aureus*, Desf., from both of which species, as from the Madeiran *D. neglectus*, Lowe, the Mogadorian plant differs in several important points.

65. This is probably *Rubia longifolia*, Poir., yet not perhaps sufficiently distinct specifically from *R. peregrina*, L., although with a wholly different aspect from the figure of that plant in Engl. Bot. t. 851. It is much less prickly and clinging or adhesive than the common Madeiran *R. angustifolia*, L. The stem and leaves are decidedly "perennial," the former suffrutescent, the leaves narrow linear elongate.

66. *Scabiosa Columbaria*, L.—Flowers bluish-lilac.

67. *Valeriana Phu*, L.—Fl. pink. Abundant at the "Emperor's garden."

68. *Erigeron ambiguus*, Schultz in W. B. ii. 208; *Conyza ambigua*, DC. v. 381.

69. *Nolletia chrysocomoides*, DC. v. 366; *Conyza chrysocomoides*, Desf. ii. 269. t. 232.

71. *Inula viscosa*, Ait., Desf. ii. 274; W. B. ii. 220; DC. v. 470; *Erigeron viscosum*, L.; *Solidago viscosa*, Lam.

73. *Anacyclus clavatus*, Pers.; DC. vi. 16; W. B. ii. 297; *Anthemis clavata*, Desf. ii. 287.—Very common in Mogador on roofs of houses, walls, &c. Varieties, α ray white, and β ray lemon-yellow. This plant also abounds in the more recent volcanic-cinder viniferous parts of Lanzarote.

74. *Kleinia articulata* (L.)?—Not in flower. Brought by an Arab, probably from some garden.

75. *Senecio crassifolius*, Willd., DC. vi. 344 (excl. var. β); W. B. ii 320.—The true Lanzarotan plant; and assuredly very distinct from the Madeiran *S. incrassatus*, Lowe (*S. crassifolius*, β, DC.).

78. *Carduus macrocephalus*, Desf. ii. 245; DC. vi. 621.—A fine species, though of humble stature, viz. 6–12 inches high. Heads very large; spines of anthodium very long and finely acuminate or slender, not strong or pungent; florets purple. Very distinct in appearance when growing from *C. nutans*, L.

80. *Scolymus hispanicus*, L., Desf. ii. 241; DC. vii. 76; W. B ii. 388.—Fl. small, axillary, sessile, orange. This species is common in Gr. Canary and in Teneriffe, especially on the road from S[ta.] Cruz to Laguna. But the habitat "Madeira, Lowe!," assigned to it by DeCandolle, *l.c.*, is a mistake, and should have been inserted under *S. maculatus*, L., a plant extremely common in Madeira, where, on the other hand, *S. hispanicus*, L., has not been found either by myself or any other botanist of my acquaintance. The mistake originates doubtless with Von Buch, who gives *S. hispanicus*, L., and no other species of the genus in his list of Madeiran plants.

81. *Hedypnois cretica*, Willd., DC. vii. 81; *Hyoseris cretica*, Linn., Desf. ii. 232.—Stem branched diffuse. Flower-stalks thickened, and scales of anthodium in fruit bristly-muricate upwards.

82. *Hedypnois arenaria*, DC. vii. 82 (not Willd., sec. DC.); *Hyoseris arenaria*, Schousb.—Slightly different in aspect, and with a more lax and slender habit than *H. cretica* (L.), Willd., DC., or *H. polymorpha*, DC., both of which Schultz, in W. B. ii. 396, pro-

perly unites into one species, *H. rhagadioloides* (L.), Schultz; keeping *H. arenaria* distinct. Its characters, however, are by no means satisfactory, and my Mogadorian specimens have not the flower-stalks thickened upwards as they are described by De Candolle.

83. *Tolpis barbata* (L.), DC. vii. 86; *Drepania barbata*, Desf. ii. 232.—Flowers much larger and of a greener yellow than those of *T. crinita*, Lowe. The two species grow plentifully up the river intermixed, preserving always a perfectly distinct appearance.

86. *Sonchus tenerrimus*, L., Desf. ii. 223; DC. vii. 186.—Suffruticose, with very fragile long slender branches and delicate fast-withering foliage. Very abundant at the Emperor's garden. Habit rather that of a shrubby *Tolpis* (*Schmidtia*) or *Crepis* than *Sonchus*.

88. *Anagallis arvensis*, L., *β cærulea*, W. B. ii. 172.—Herbaceous annual. Fl. deep cobalt-blue. Exactly the common Madeiran and Canarian plant.

89. *Anagallis collina*, Schousb. DC. viii. 70.—Perennial suffrutescent. Fl. scarlet, rather large and handsome.

91. *Argania Sideroxylon*, Roem. & Sch. DC. viii. 187; *Elæodendron Argan*, Retz, Willd., Schousb.; *Sideroxylon*, L.; *Rhamnus*, L. This, the characteristic plant of the district, is a low, spreading Rhamnus-like tree, from 20 to 30 feet high, with stiff stout spreading branches, and scanty or small foliage. Leaves fascicled on short, often spinose, spurs. Fl. small, aggregate, on the short side spurs of the branches, greenish-yellow. Fr. a hard smooth yellow-green oblong plum-like drupe, about an inch and a quarter long, and half an inch in diam., round, pointed at top, with scarcely any fleshy coat. The oil obtained by expression from the roasted shining brown "stones" inside, or kernels, is universally employed for various domestic purposes, particularly for burning in lamps, and as a substitute for butter in confectionary, frying, and other culinary arts or preparations. It is peculiarly limpid, and of a pale-yellowish colour. The smell and taste resemble that of burnt almonds; and it has the excellent property, that no offensive smell ensues on extinguishing a lamp which has been fed with it. The flowers appear in spring, shortly after, or simultaneously with, the ripening of the fruit. Branches were brought to me in April full at once of flowers and fruit.

For a full and interesting account of this plant, both in its botanical and economical relations, illustrated with admirable figures, see a valuable paper by Sir W. J. Hooker in the 'Journal of Botany,' vol. vi. p. 97, tabb. 3, 4.

95. *Jasminum fruticans*, L., Desf. i. 6; DC. viii. 313.—In fruit only.

96. *Nerium Oleander*, L., Desf. i. 208; DC. viii. 420.—Very abundant in the bed of the river, in detached bushes, beginning to flower.

101. *Echium maritimum*, Willd., DC. x. 23?—The specimens are insufficient to enable me to determine whether they may not rather perhaps belong to *E. plantagineum*, L.

102. *Solanum humile*, Bernh. W. B. iii. 122; DC. xiii. 56.—Very like *S. nigrum*, L., but of humbler growth, with smoother, somewhat smaller leaves, and waxy-looking pale dull ochre-yellow berries.

103. *Lycium barbarum*, L., Dun. in DC. xiii. 511.—This is, I believe, though without fl. or fr., the common Canarian species (*L. afrum*, Reich. in Webb) so particularly abundant in Lanzarote and Fuerteventura, which has small orange (miniaceous) elliptic-ovate or oblong-ovate berries, pointed at the apex, 2–4 or 5 lines long, and 1–2 broad; not "globose," "the size of a cherry," as asserted by H. G. Reichenbach in Webb and Berth. Phytogr. Can. iii. 285, 286, probably from fruit of the true *L. afrum*, L., substituted for that of the Canarian plant, which is therefore more properly referable to *L. barbarum*, L., of Dunal in DC. *l. c.*, although the flowers in Lanzarote and Fuerteventura are not "pale red or rose," but deep lavender or lilac-blue. The fruit is commonly eaten by children, and is called in Fuerteventura "Romáme"; the low, excessively stiff, dense and rigid spinose bush being called "Espiño" in the Canaries generally. *L. europæum*, L., I have found only in Palma.

107. *Linaria heterophylla* (Schousb.), W. B. iii. 141; DC. x. 270. This grows also on the sea-cliffs and on rocks in ravines at the north end of Lanzarote; also in Fuerteventura, and in the little intermediate isle of Lobos; but it has not hitherto been found in any other of the Canary Islands.

108. *Linaria purpurea* (L.), Mill., DC. x. 278; *Antirrhinum purpureum*, L., Curt. Bot. Mag. t. 99.—This is the little violet-blue-flowered annual Snapdragon so commonly seen in English gardens.

109. *Scrophularia lævigata*, Vahl, DC. x. 309; *Scr. trifoliata*, Desf. ii. 54 (non Linn., sec. Benth. in DC. *l. c.*).

110. *Scrophularia canina*, L., Desf. ii. 53; DC. x. 315.—A very distinct species, with minute, almost black flowers.

114. *Vitex agnus-castus*, L., Desf. ii. 61; DC. xi. 684. — Most

abundant up the river, both in its bed and in the thickets on its banks; but not yet in flower.

117. *Mentha sylvestris*, L., *ε nemorosa*, DC. xii. 167, *δ* Sm. Engl. Fl. iii. 73.—This var. occurs also in most of the Canaries.

118. *Thymus Broussonetii*, Boiss., DC. xii. 205. — Shrubby. Heads of flowers violet.

120. *Nepeta Apulei*, Ucr., DC. xii. 375; *N. tuberosa*, Desf. ii. 10 (not Linn.).—Fl. rose-purple.

121. *Ballota nigra*, L. ?—Not in fl., but probably the plant.

123. *Teucrium Polium*, L., *ζ angustifolium*, DC. xii. 592; *T. capitatum*, L. sec. Benth. in DC. *l. c.*

125. *Statice sinuata*, L., Curt. Bot. Mag. t. 71; Desf. i. 276; DC. xii. 635.—Wings of the branches plain or flat, not plaited. Fl. blue. Near Mogador; also along the coast towards Saffee. Dr. Carleton.

126. *Statice mucronata*, L. fil., Desf. i. 275; DC. xii. 639.—Wings of branches waved, or plaited like a frill. Flowers lilac. Said to grow also plentifully on the island off the town.

130. *Plantago lusitanica*, L.—Characterized by its tawny villose heads, and pedicels longer than the leaves.

134. *Pircunia dioica* (L.), DC. xiii. 2. 30; *Phytolacca dioica*, L. —Planted ornamentally, as at Lisbon, Cadiz, &c. Just coming into flower, April 25th.

135. *Beta vulgaris*, L., *β maritima*, Moq. W. B. iii. 197; DC. xiii. 2. 56; *B. maritima*, L., Desf. i. 216; Engl. Bot. t. 285.—Fl. sessile, 1–2 together, coadnate.

141. *Polygonum maritimum*, L., Desf. i. 332; W. B. iii. 220; DC. xiv. 88; Engl. Bot. Suppl. t. 2804.—Sea-beach close to the Emperor's unfinished and deserted palace.

143. *Euphorbia pubescens*, Vahl; *E. platyphylla γ*, Roep. Enum. 60; *E. platyphylla*, var. *pubescens*, Roep. W. B. iii. 245. — Stem, leaves on both sides, and capsules softly and thickly hairy, the caps. strongly and coarsely warted. Seeds ovoid, dark brown, finely, but distinctly and prominently warted.

144. *Euphorbia heterophylla*, Desf. i. 385. t. 102=*E. obliquata*, Forsk. W. B. iii. 246=*E. seticornis*, Poir.=*E. provincialis*, Willd. =*E. terracina*, DC. &c., sec. W. B. *l. c.*

148. *Parietaria diffusa*, Koch, Syn. 733; *P. officinalis*, L., Sm. Engl. Bot. t. 879; Engl. Fl. i. 222; Bab. Man. (ed. 4) 294; *P. judaica*, W. B. iii. 262 (not Linn. sec. Koch, *l. c.*). Leaves small, $\frac{3}{4}$ inch long, $\frac{1}{2}$ inch wide, short, ovate, pointed at each end, triple-nerved (not three-nerved), two lowest side-nerves originating from

the midrib a little above the base. Fl. small, densely crowded. Perianth red, after flowering cylindric-elongate.

Without further study, and investigation on the spot, I abstain from recording as a distinct species, and as possibly the true *P. judaica*, L. (see Koch, *l. c.*), some specimens of a plant with certainly a very different aspect, but whose differences have the appearance of being perhaps due merely to a rich soil or shady moist situation. Stems elongate, weak, succulent, diffuse. Leaves 2–3 inches long, 1–1¼ broad, elliptic, acuminate, though obtuse at the tip, three-nerved, the two side-nerves originating quite at the base of the midrib. Fl. larger than in *P. diffusa*, Koch, and in larger, looser, greener clusters. Perianth brown, tipped with green, ultimately cylindric-elongate. It differs from *P. erecta*, Koch, in its diffuse habit and three-nerved instead of triple-nerved leaves. In this latter respect, no less than in the size and shape of the leaves, &c., it differs remarkably from *P. diffusa* also.

151. *Ephedra fragilis*, Desf. ii. 372.—Most abundant in thickets at the Emperor's garden, in bushes 5 or 6 feet high, loaded with crowded clusters of small greenish-yellow flowers.

153. Precisely the Madeiran *Ruscus Hypophyllum*, *β lanceolatus*, Lowe, Prim. 12, with narrow elliptic-lanceolate acuminate leaves, and small chaff-like floral bracts.

154. *Asparagus Pastorianus*, W. B. iii. t. 229, found abundantly in Lanzarote and Fuerteventura, is so well-marked a species, that I have little doubt of its identity with these Mogadorian specimens, although they are without flower or fruit.

155. Amongst the five Canarian species of *Asparagus* enumerated by Webb, and one or two more, found by myself, which appear to have escaped his notice, I can find nothing agreeing with the present plant, with its very fine close capillary tufts of leaves, which give it quite a peculiar habit. It is perhaps a mere form or variety of *A. retroflexus*, L., but the leaves are finer and longer, and it also wants the short reflexed spines beneath the knobs or spurs of the branches. However imperfect, therefore, my materials, the specimens having neither flower nor fruit, it is perhaps best to describe them provisionally under a new name :—

A. FŒNICULACEUS, *Lowe*. Inermis, caule fruticoso lævi glabro; foliis fasciculatis ramulisque tenuissimis capillaceis acutis glabris confertis dumosis; fl. fructuque. . . . . . .

A. retroflexus, Linn.?

Hab. Prope urbem Mogadorensem.

159. Although there are no Date-trees visible, or at least con-

spicuous in the immediate precincts of the town or sea-coast, they must be very plentiful more in the interior, from the abundance of their fruit in Mogador.

163, 164. These not being in fl. or fr. cannot be positively determined. The *Potamogeton* abounds in the river.

Mosses of the Amazon and Andes. By RICHARD SPRUCE, Esq. (Communicated by G. BENTHAM, Esq., V.P.L.S.)

[Read March 1st, 1860.]

IN the following memoir I propose in the first place to describe, at some length, the more remarkable genera and species of Mosses I have collected on the Amazon and its tributaries, and in the Andes of Maynas and Quito; and afterwards to give a synoptical catalogue of all the mosses known to me in those regions. I reserve also for the concluding part, my remarks on the geographical distribution of the species, for the elucidation of which my materials are daily augmenting.

ANDREÆA, *Ehrh.*

ANDREÆA BREVIPES, sp. n. *Cæspites* densi atro-rufi. *Caules* vix semunciales suberecti fastigiato-subramosi; rami clavati dimidio inferiori foliis minutis squamæformibus rotundo-ovatis subapiculatis vestiti. *Folia* superiora sensim vel subito crescentia, erecto-patula vel patulo-incurva, siccando vix mutata, oblongo- vel ovato-lanceolata, canaliculato-concava, apice subelongato subacuto incurvo, enervia; cellulis minutis parenchymaticis dorso papillosis, infimis anguste rectangularibus, mediis elongato-6-gonis, supremis subquadratis. *F. perichætialia* caulinis ter majora cæterum conformia vel magis elongata subconvolutivo-concava. *Florescentia* dioica. *Flores* ♀ 5–12-gyni. *Pseudopodium* pallidum, foliis perichætialibus brevius, basi archegoniis sterilibus obsitum. *Capsula* anguste fusiformi-oblonga pseudopodio subæquilonga ad $\frac{2}{3}$ usque fissa.

Hab. Ad saxa in alpinis montis Titaicún, Andium Quitensium orientalium, haud procul a Riobamba.

Dimensiones partium in millimetris Parisiensium adjicio. *Folia* ·6m. × ·25m. (*i. e.* longa ·6 mill., lata ·25 mill.); perichætialia 1·8m. *Pseudopodium* 1·4 m. *Capsula* 1·25m.

Folia inferiora, quamvis minima sint, tam perfecta quam superiora, nec marcida. Frequenter adsunt rami flagelliformes foliis squamæformibus omnino vestiti.

Ab *A. rupestri*, Hedw., et *A. turgescente*, Schimp., differe videtur pseudopodio immerso, et a priori foliis nunquam falcato-secundis.

Generis in Cordillera Andium admodum rari altera species (*A. subenervis*,

Hook. et W.), longe nobilior in cinere vulcanico invenitur, locis Paramo de Ruiz (*Purdie*) et Volcan de Pichincha (*Jameson*).

It is difficult to decide from descriptions whether *A. brevipes* and *A. turgescens* may not be mere varieties of *A. rupestris*, to which opinion I rather incline. The inflorescence of the *Andreææ* seem to vary as in many *Hepaticæ*, and the length of the fruit-stalk as in *Sphagnum*.

Acroschisma, *Hook. f.* et *Wilson.*

Acroschisma andensis, sp. n. *Cæspites* laxiusculi. *Caules* unciales e basi decumbente erecti subramosi v. nonnunquam valde ramosi. *Folia* haud dense imbricata, inferiora badia late patula v. etiam squarrosa, sicca vix mutata, ambitu anguste ovato-lanceolata sensim subacuminata obtusiuscula, supra basin valde concavam (fere hemisphæricam) panduriformi-constricta et ita canaliculata ut subulata videntur, apice subincurva, enervia; superiora (secus ramorum apicem) sensim majora e rufo flavida, incurvo-erecta longe ovato-lanceolata subacuta canaliculato-concava, supra basin erectam amplectentem paullo constricta, enervia v. basi brevissime 2-plurinervia. *F. perichætialia* caulinis inferioribus quater majora, erecta convolutiva subacuta apiculatave, raro enervia, sæpius basi 2–10-nervia, et haud raro lineis brevibus longitudinalibus incrassatis hic illic sparsa. *Cellulæ* foliorum parvæ læves parietibus crassis; infimæ lineari-rectangulares, mediæ subelongate hexagonæ, supremæ subquadratæ. *Monoica. Flores* ♂ laterales, turgide gemmiformes, foliis subrotundis apiculatis concavis enerviis; *antheridia* sub-20 majuscula cylindrico-subulata (obclavæformia) incurva, cum paraphysibus longioribus filiformibus vix parum clavatis articulatis sæpe apice in conum adglutinata. *Flores* ♀ terminales 4-gyni eparaphysati, archegoniis sterilibus ad pseudopodii basin persistentibus. *Pseudopodium* perichætium excedens basi pallidum superne rufum siccando dextrorsum valde contortum, apice subincrassatum et tubum vaginalem lacerum gerens. *Capsula* erecta rufa lævis cylindracea secus apicem paullisper latior, siccando cylindrico-urceolata, collo nullo, ab apice vix ad $\frac{1}{4}$ usque in valvulas 10 subinæquales fissa, valvulis disco parvo apicali coalitis et siccando cum eodem (columellæ tenui adhærente) intro curvatis. *Capsulæ parietes* e cellularum laminis duabus conflati; cellulæ laminæ exterioris validæ, inferiores lineares subflexuosæ, valvularum rectangulares secus apicem quadratæ, laminæ interioris pallidæ teneræ. *Calyptra* parvula tenerrima mitræformis basi lacera apice stylo persistente coronata.

Dimensiones. Folia caulina inferiora 1m. × ·38m.; perichætialia 4·1m. × 1·5m. *Cellulæ* medii folii ·015m. *Capsula* 1·9m. × ·4m.; valvulæ ·45m. *Pseudopodium* 6·25m.

Hab. Ad saxa vulcanica montis ignivomi Tunguragua, alt. 11,000 ped.

Ab *A. Wilsoni*, Hook. f., foliis perichætialibus basi plurinerviis et capsula minus profunde fissa, valvulis 10 (nec 4–8), differt.

The first, and hitherto the only described species of this remarkable genus was discovered by Dr. J. D. Hooker in the Antarctic Islands. *A. andensis* shows a nearer approach to peristomate mosses than even *A. Wilsoni,* for the valves of the capsule, besides being more numerous, are not longer than many peristomes. The calyptra is torn away at an early stage, and often remains sticking to the points of the perichætium when the capsule is elevated beyond the latter by the growth of the fruit-stalk. Four of the capsule-valves are generally narrower than the rest, so that, though I have constantly found ten valves, I should expect them to be occasionally reduced to eight. The valves are from four to eight cells wide at the base, the total circumference of the capsule at that part consisting of about fifty-two cells.

TAYLORIA, *Hook.*

1. TAYLORIA LIMBATA, sp. n. *Plantæ* plagas latas efformantes. *Caules* elati 1–3-unciales, tomento purpureo intertexti, simplices v. secus basin paullo et fastigiatim ramosi, laxe foliosi. *Folia* patula, siccando crispata subtortaque, magna, pallide viridia, margine 4–7 cellulas lato albido flavidove haud incrassato limbata, in caulem longe decurrentia, cuneato-ovalia vel, basi magis elongata, subspathulato-ovalia, apiculo tenui recurvo terminata, supra medium (rarius fere a basi) denticulata serrulatave, profunde carinata, alis recurvo-patulis; nervo validiusculo ad apiculi basin desinente, rarius in apiculum excurrente; cellulis majusculis chlorophyllosis 6-gonis, inferioribus elongatis, apicalibus subæquilateris, limbi tamen inferioribus rectangularibus parenchymaticis, superioribus rhomboideis prosenchymaticis, chlorophyllo destitutis. *F. perichætialia* caulinis conformia. *Flores* ♂ haud inveni, adsunt tamen antheridia (?) sterilia rudimentariave in plantæ ♀ foliorum superiorum axillis alabastro minuto inclusa. *Pedunculus* terminalis exsertus rufus siccitate sinistrorsum contortus. *Capsula* pedunculi dimidio sublongior, erecta cylindrica rufa, collo brevi obconico, ore subangustata exannulata. *Operculum* conico-subulatum obtusum. *Calyptra* operculum paullo excedens, capsula dimidio brevior, anguste conica, basi primitus inflexa serius porrecta et 4–6-laciniata, papillis suberectis recurvulisve breviusculis, nonnullis tamen magis elongatis basique dilatatis unde squamæformibus, scaberula. *Peristomii* dentes 16 rufi æquidistantes, apice in conum subtortum conniventes, siccando vix mutati vel raro suberecti, elongati subulati articulati minutissime granulosi, ad lineam mediam sæpe angustissime hiantes, basi in membranam saturate sanguineam 3 cellulas latam capsulæ orificium paullo superantem coaliti.

Dimensiones. Folia 6m.×3m.; *cellulæ* basales ·2m.×·04m.; *apicales*

·60m. *Pedunculus* 6·7m. *Capsula* 3·7m.×1m. *Operculum* 1·5m. *Calyptra* 2m.

Hab. In sylvis ad latus boreale montis Pichincha, secus pagum Nono; terrestris.

Tayloria Jamesoni, C. Muell. (*Brachymitrium,* Tayl.), in eodem monte ab am. Jameson inventa, folia obtusa incrassato-marginata et capsulam oblongam habet. *T. limbata* habitu *Mnium subglobosum* valde refert.

2. Tayloria laciniata, sp.n. *Cæspites* lati parvuli subpulvinati e basi angusta superne patuli. *Caules* tenuiusculi 1–2-unciales basi radiculis prælongis rubellis ramosissimis intertexti, ut videretur simplicissimi, valde sparsifolii, 3-alati. *Folia* sub 3-sticha pallide viridia majuscula patula, siccando vix parum torta, basi longissime decurrentia, spathulata carinata profunde laciniata, laciniis cujusque lateris subroctonis lato-subulatis sensim tenui-acuminatis, lacinia terminali nervo excurrente longe cuspidata; cellulis chlorophyllosis elongato-hexagonis, infimis vix paullo majoribus subrectangularibus parenchymaticis, superioribus tamen fere omnibus prosenchymaticis. *F. perichætialia* fere in verticillum approximata, caulinis subsimilia magis profunde laciniata vel potius pinnatifida, cuspide terminali longissima tenuissima. *Flores* dioici: ♂ in planta humiliore terminalis subdiscoideus; *antheridia* plurima rubella elongato-ovalia, paraphysibus sublongioribus clavatis stipata. *Flos* ♀ terminalis polygynus paraphysibus paucis nullisve. Adsunt etiam in plantæ fœmineæ foliorum superiorum axillis antheridia (?) sterilia nuda. *Capsula* foliis perichætialibus longe superata, flavida basi apiceque aurantiaca, ovata vel ovato-oblonga turgidiuscula, collo vix ullo, microstoma exannulata, pedunculo rufo perbrevi suffulta. *Operculum* fere ter brevius conicum subacuminatum obtusum. *Calyptra* operculum paullo excedens anguste conica tuberculis papillisve pellucidis raris sparsa, basi subturgida incurva et laciniata. *Peristomium* rubrum madore conum apice tortum efformans, siccando convexo-connivens subtortumque; dentes 16 æquidistantes subulati acumine capillari, obscure articulati grossius granulosi, linea media sæpe hiantes, basi in membranam perangustam 2–3 cellulas latam capsulæ orificium haud superantem coaliti.

Dimensiones. Folia 5·3m.×2·8m.; laciniæ 1m.; acumen 1·8m.; cellulæ ·1 ad ·125m. *Penduncülus* 1·5m. *Capsula* 2·4m.×1·5m. *Operculum* ·9m. *Calyptra* 1·12m. *Peristomium* ·75m.

Hab. In sylva Llalla ad pedem occidentalem montis Azuay, alt. 9000 ped., ubi ad ramulos inter Plagiochilas Metzgeriasque viget.

Muscus perbellus, foliis subpinnatifidis maxime singularis, a *Tayloria Moritziana,* C. M., et *T. orthodonte* (*Orthodon serratus,* Bory), capsula ovata immersa bene distincta. *Folia* caulina, laciniis abstractis, anguste cuneata, perichætialia lineari-oblonga.

3. Tayloria erythrodonta (*Tortula erythrodonta,* Tayl., Lond. Journ. of Bot. 1846, p. 50; *Streptopogon erythrodontus,* Wils. Lond.

Journ. 1851, p. 51). *Cæspites* a basi scutata laxe pulvinati, *Orthotrichoidei*, copiose fructiferi. *Caules* erecti basi radiculis fuscis intertexti subdichotome ter quaterve divisi, ramis suberectis patulisve densifoliis. *Folia* inferiora rufescentia superiora amœne viridia, subrecurvo-patula et sæpe subtorta, siccando crispato-torta, majuscula lanceolato-ligulata anguste acuminata, nervo tenui in cuspidem tenuem exeunte, acute vel etiam complicate carinata secus apicem argute serrulata, margine a basi ultra medium recurvulo; *cellulis* parvis fere omnibus parenchymaticis oblongo-6-gonis, basalibus rectangularibus, paucis apicalibus rhombeis, lateralibus 3–4-seriatis angustissime linearibus. *Flores* androgyno-polygami: nempe *antheridia* plura clavata cito decidua paraphysibus paucis linearibus nullisve stipata in f. perichætialium axillis, raro flore gemmiformi foliis parvis lanceolatis acuminatis inclusa; adsunt etiam flores fœminei quibus folia perichætialia antheridiis orbata sunt, et (sed rarissime) cum archegoniis mixtum antheridium unum alterumve sterile invenitur. E perichætiis profertur innovatio una alterave folia minuta et flores rudimentarios gerens. *Capsula* terminalis pallide rufa pedunculo brevi immerso, siccando dextrorsum contorto subbrevior, perichætium æquans vel subsuperans, cylindrica stricta curvulave, collo vix ullo. *Operculum* capsulæ dimidium vix æquans elongate conicum vel subulatum obtusum e cellulis sinistrorsum contortis conflatum. *Calyptra* pallida apice nigrescens, operculum basi vix excedens, peranguste conica subulatave papillis angustis setulisve subscabra, basi lacera, raro uno latere fissa. *Peristomium* ruberrimum madore conum semel sinistrorsum contortum efformans, diametro baseos quam capsulæ latitudinem dimidio minori, siccitate cylindricum apice varie tortum; dentes 32 filiformes æquidistantes vel obscure per paria approximati, e membrana 12-ies breviori orti, singuli e ciliis 2 teretibus distanter articulatis crebre minute granulosis, per totam longitudinem coalitis, raro ad suturam hiantibus, conflati.

Dimensiones. *Folia* 5·5m. × 1·4m.; perichætialia 7m. × 1·5m. *Pedunculus* 3·75m. ad 6·25m. *Capsula* 3m. × ·5m. ad 4·5m. × ·75m. *Operculum* 1·4m. ad 2m. *Calyptra* 1·75m. ad 2·4m. *Peristomium* 1·5m.; *membrana basilaris* ·125m. *Cellulæ folii* ·035m. ad ·09m.

Hab. Per Andes Quitenses, regione temperata, alt. 6000–10,000 ped., ad fruticum ramulos valde frequens.

Muscus ex omnibus muscis Quitensibus vulgatissimus, et eadem ratione sat variabilis, foliis latioribus vel angustioribus, pedunculo longitudine vario nunquam tamen folia perichætialia æquante, et peristomio semel vel haud ferme torto, ludens; itaque muscus verbis sequentibus descriptus, anne varietas anne species propria sit, mihi adhuc incertum.

Var. β. Clavipes. Elatior sesquiuncialis flavida minus ramosa; *folia* robustiora, perichætialia anguste ovato-lanceolata sensim longe acuminata, superne subspinuloso-serrata, cellulis paullo majoribus; *capsula* pedicello clavato pallido duplo longior, folia perichætialia vix

æquans, immersa, sæpe subovato-cylindrica; *peristomium* spiram dimidiam efformans vel fere omnino rectum, dentibus sæpe per paria inæquilongis (ad instar peristomii *Leptotrichi, Dicrani,* &c.); calyptra scaberrima.

Hab. In sylvis Llalla et Pallatanga, Cordilleræ occidentalis, ad truncos.

Columella in hac, ut in speciebus duabus præcedentibus, ad capsulæ orificium articulata, dimidio superiore cum sporis deciduo, inferiore intra capsulam retracto. *Granulæ peristomii* in annulos transversales dispositæ.

That this moss is a genuine species of *Tayloria* I cannot doubt; the conical scabrous calyptra is exactly the same as in the two preceding species, and the structure of the leaves the same, though the cellules are smaller. The rudimentary antheridia in the axils of the upper leaves of *T. laciniata,* and of several other *Splachneæ,* are in *T. erythrodonta* replaced by completely-formed antheridia, constituting with the terminal archegonia a distinct androgynous inflorescence. If the peristome be regularly contorted (as in *Tortula*), there is also in the peristome of the other two species a tendency to twisting at the apex; and in all three the sporular sac has at the apex a firm coloured ring (the base of the peristome) free from the walls of the capsule. The teeth are quite like those of *T. splachnoides*; but in the latter they are separately twisted, not together contorted into a spire, as in *T. erythrodonta.*

Dissodon is plainly a mere subgenus of *Tayloria*; and *D. serratus,* C. M. (*Orthodon*), has no more right to be separated from its very near allies, *Tayloria laciniata, Moritziana,* &c., on account of the difference in the peristome, than *Orthotrichum affine* from *O. Lyellii* and *O. striatum.* My only doubt is whether even *Tayloria* should not be reunited, as a subgenus, with *Splachnum.*

Tayloria laciniata and *erythrodonta,* like *T. Rudolphiana,* B. et S., and *Splachnum octoblepharum,* Hook. (which are perhaps the nearest allies of the latter), grow on trees; but *T. erythrodonta* has the peculiarity of growing only on living plants, of which it selects generally the slender branches, and is even occasionally found on suffruticose perennials (*Solaneæ* and *Malvaceæ*): when the matrix whereon it is established dies, its own dissolution speedily follows. This leads me to remark on *the true parasitism of many mosses,* about which I may have occasion to speak more at length in a separate article. My attention was first forcibly directed to it in the forests at the mouth of the Amazon, where I observed that certain *Jungermanniaceæ,* especially species of *Omphalanthus,* creeping on green leaves, speedily decayed after the fall of the latter, which they had perhaps hastened. I then recollected that certain *Orthotricha,* such as *O. crispulum, O. Ludwigii,* and *O. Drummondii,* soon withered up if the slender twigs on which they delight to

establish themselves happened to die. I have since had abundant opportunity of observing similar cases, and there are none more striking than those afforded by the beautiful genus (or subgenus of *Bryum*) *Acidodontium*, of which there are numerous species in the Andes, and all choose their habitat on living branches, some preferring the slenderest twigs of the loftiest trees, whereon the dense pulvinate tufts sit perched quite like those of many *Orthotricha* and *Zygodontes*. It is true that Humboldt and Bonpland found their *Bryum megalocarpum* (Hook.) "in crepidinibus inter Tulcan et Quito," and that in a similar situation I picked up my first *Acidodontium*, but a piece of bark attached to the latter revealed its arboreous origin. There is indeed one species, on Mount Tunguragua, which I have to this day seen only on fallen branches, recently torn from lofty trees by the winds. I can only state further, for the present, that I have satisfied myself, by observation and experiment, that these and many other ramicolous mosses do actually sustain themselves (in part) at the expense of the branch whereon they grow, and even in many cases without causing the slightest lesion of the cortical integument.

Ambato, Ecuador, Dec. 17, 1859.

Note on the Tree Mallow. By JOHN HOGG, Esq., F.R.S., F.L.S.

[Read April 19th, 1860.]

I BEG to exhibit to the Linnean Society a small piece of the stem and bark of the Tree Mallow (*Lavatera arborea*, Linn.), a species now rare in Britain.

Linnæus, in his 1st edition of the 'Species Plantarum,' 1753, does not appear to have known that the plant was a native of so northern a district as the British Islands, for he there refers it to the west coast of Italy, and says,—"Habitat inter *Pisas* et *Liburnum*."

In the last week of August 1857, I gathered some ripe seeds from a plant which I found on the coast of the South of Ireland; the plant itself being not much more than 4 feet in height. I sowed some of the seeds in April 1858 in my garden in rich soil; but the young plants were not transplanted, and did not flower that year. During the last spring and the beginning of the summer (1859), though a very dry season, two or three of the plants grew very rapidly, and attained more than 7 feet in height. They flowered freely all the latter part of the summer, and during the autumn.

In the early part of last December, on my return home, I found the plants green and in full strength, but the very severe frost which occurred soon after the middle of that month quickly killed them; at Christmas I cut them down to the root, and took from one of them the present specimen. Most appropriately, indeed, has this tall and shrub-like biennial plant been termed *arborea*, for the lower portion of the stem (now exhibited) presents quite a *woody* aspect: it is, however, exceedingly light, and on taking it in the hand, it is at once found to be a stem of very rapid growth. The diameter of it, though not a regular circle, is just about 2½ inches, exclusive of the bark, which is a quarter of an inch thick.

This piece of stem exhibits an inner circle, ⅞ inch in diameter, which is darker in colour than the second, or outer ring or circle, and is, I conclude, to be considered as the stem of the first year's growth. The outer circle shows a still greater and more rapid increase, being double of the former, or, if I am correct in my conclusion, the second year's growth of the stem is fully twice that of the first year. Now, supposing it to be possible that this rapid mode of increase should take place, in the like proportion, in any forest-tree, what an enormous and magnificent tree would be visible to the world after a growth of some fifteen or twenty centuries! It would rival, if not surpass, in stupendous magnitude, the *Wellingtonia gigantea* of the New World!

Next, as regards the bark: it will be apparent that the inner portion is extremely fibrous, though coarse in its nature, and evidently well adapted, in an economical point of view, for being formed into strong ropes, mats, and the like purposes; and I should also think it might be used in the fabric of coarse paper. It is well known that some of the *Malvaceæ* are employed in the manufacture of cordage; but I cannot find in any of our botanical works an account of the *Lavatera arborea* being so employed. One plant of the same natural family, the Lime-leaved Sida, or *Sida tiliæfolia*, is cultivated somewhat extensively in China, for the sake of its finer fibres, which are esteemed equal to flax and hemp.

From the size and height to which the *Lavatera arborea* attains in rich soil, a single acre sown with it would doubtless afford an immense quantity of strong ligneous fibres, and so, probably, amply repay its cultivation, which is perfectly easy, and requires no particular care, except that during the first winter a little attention in protecting the young plants from extreme frost might be desirable.

Notes on *Ternstrœmiaceæ*. By George Bentham, Esq., V.P.L.S.

[Read April 5th, 1860.]

Since the publication of the first volume of the 'Prodromus' and of DeCandolle's Memoir in 1823, the beautiful tropical family of *Ternstrœmiaceæ* has several times engaged the attention of botanists. Cambessèdes, when working at A. de St.-Hilaire's 'Flora Brasiliæ Meridionalis,' published in 1828 a 'Mémoire sur les Ternstrœmiacées et les Guttifères;' subsequently Martius, Pohl, and Pœppig figured and described several species in their respective works on S. American plants; whilst many Asiatic ones have been published by Wallich, Griffith, Gardner, Champion, Blume, and especially by Korthals, and generally with more or less of generic modification. Finally, Choisy undertook a general revision of the Order, and, after visiting the herbaria of Paris, London, and Kew, published in 1855 his 'Mémoire sur les Ternstrœmiacées et les Camelliacées,' some portions of which have been revised or commented upon by Miquel in his 'Flora van Nederlandsch Indie,' or by Seemann in his paper on *Camellia* in the last Part of the 'Transactions' of this Society.

The preparation of the 'Hong-Kong Flora' having obliged me to verify the characters of ten of the genera adopted by Choisy, I have taken the opportunity of going over the whole Order for the 'Genera Plantarum' which I am preparing in conjunction with Dr. Hooker, and at the same time of settling more accurately the determination of the species contained in Mr. Spruce's collections. Several observations have suggested themselves in the course of this examination, which have appeared to me of sufficient interest to lay before the Linnean Society.

Giving due credit to M. Choisy for the useful indications he has given as to the limits, affinities, and arrangement of several genera, I am unable to coincide with him as to the relative value of the groups into which he has distributed them. Their separation into two 'familles principales'—the *Ternstrœmiaceæ* allied to *Ebenaceæ* among *Gamopetalæ*, and the *Camelliaceæ* near *Guttiferæ* among *Dialypetalæ*—seems to me neither natural nor justified by any positive character. *Cleyera* and *Freziera*, retained among the former, have their petals much freer than those of *Gordonia* and *Camellia*, placed in the latter family; and the whole group of *Gordonieæ* seems to me to be very much nearer to *Ternstrœmieæ*, from which he removes them so far, than to *Bonnetieæ*, with which he unites them.

The union of the base of the petals into a perfect corolline tube is indeed sometimes very marked, especially in several species of *Saurauja*, *Ternstrœmia*, and *Eurya*; but in a large number of others the margins of those petals which are external are free, or can be traced in prominent lines to the base; and from these to the free petals of some Frezieras the passage is very gradual, showing that the union must be considered in the same light as that which occurs in so many *Malvaceæ*, and that the affinities of the whole group are essentially among *Dialypetalæ*. The close connexion of *Ternstrœmiaceæ* with *Guttiferæ* and *Hypericineæ*, and their rather more distant affinity with *Tiliaceæ* and *Dipterocarpeæ*, have long since been pointed out, nor has any more intimate connexion been suggested. Among *Gamopetalæ* the affinity with *Sapotaceæ* suggested by Lindley, with *Ericaceæ* pointed out by Planchon, and with *Ebenaceæ* insisted on by Choisy, may in some cases be traced, but it is evidently always much slighter than those above mentioned among *Dialypetalæ*.

Among the genera collected together by Choisy to form his Gamopetalous order *Ternstrœmiaceæ*, the genera *Ternstrœmia*, *Adinandra*, *Cleyera*, *Freziera*, and *Eurya* are indeed so closely connected with each other that their distinct separation by positive characters is very difficult. All have a similar habit and inflorescence, adnate anthers, the fruit either perfectly indehiscent or with a slight tendency to the loculicidal dehiscence, and the seed with a long cylindrical curved or horseshoe embryo, in a varying quantity of albumen, sometimes rather thick and fleshy or even granular, more frequently thin or even reduced to a scarcely perceptible pellicle lining the testa. But with this tribe Choisy unites *Saurauja*, which has a different habit and inflorescence, versatile anthers, and a comparatively small straight embryo in a more copious albumen. On the latter account, as well as for some peculiarities in the foliage, Lindley had proposed to remove it to *Dilleniaceæ*, next to his new genus *Actinidia*, with a suggested affinity with *Chletra* among *Ericaceæ*; and it is certain that we have here connecting links with both of these otherwise widely distant families. The connexion, indeed, of *Saurauja* with *Actinidia* (*Trochostigma*, Zucc.) is so close that the two must be taken together as explaining in some measure each other's position in the system. Of the two, *Actinidia* is without doubt the nearest to *Dilleniaceæ* in its scandent habit and foliage and less united carpels; yet even here the characteristic anthers and seeds of the latter Order are wanting, and although the carpels do not always

quite meet in the axis, and even diverge at the summit, yet they are not so decidedly apocarpous as in almost all *Dilleniaceæ*. *Dillenia* itself is, it is true, anomalous in the Order, having almost the carpels of *Actinidia*, and no arillus to the seed; yet the habit, the anthers, the shape of the seed, the albumen and embryo are those of other *Dilleniaceæ*, and very different from those of *Actinidia* and *Saurauja*. In several species also of *Ternstrœmia*, *Adinandra*, and other Ternstrœmiaceous genera, the carpels, although converging and uniting at the base of the styles, are more or less distant lower down, leaving a hollow centre. In *Saurauja* the gamopetalous corolla, the insertion of the stamens, the styles, and many other points, are so decidedly Ternstrœmiaceous as to prevail over the Dilleniaceous foliage, the embryonic character being in this instance one of degree only. We have proposed, therefore, to retain both *Actinidia* and *Saurauja* in *Ternstrœmiaceæ*, although in a small separate tribe, distinguished as above from *Ternstrœmiæ* proper.

Of the eight species known of *Actinidia*, two have the sepals so little imbricated that one had been referred by Gardner to *Tiliaceæ* (under the name of *Heptaca*); but the other species show that the æstivation is essentially imbricate, although less so than in the generality of *Ternstrœmiaceæ**.

To the two genera *Saurauja* and *Actinidia* we propose to add, in the same tribe of *Sauraujeæ*, Zuccarini's Japanese genus *Stachyurus*, of which we have a second species, gathered by Dr. Hooker in Sikkim†. Originally referred to *Pittosporeæ*, it has been very pro-

* Zuccarini published five species of *Trochostigma*, of which we have not seen authentic specimens; but there is reason to believe that two of them (*T. argutum* and *T. rufum*) are but slight varieties of the N. Indian *Actinidia callosa*, which certainly includes *A. Kolomikta*, Rüppel in Maxim. Fl. Amer. 63, from the Amur River, and has been gathered by Wilford in Mantchuria. If such be the case, we have, besides these four Japanese species, two from South China (*A. chinensis*, Planch., and *A. Championi*, Benth.) and the two following new ones:—

A. strigosa, Hook. fil. et Thoms. Dioica?, strigoso-hispida, foliis petiolatis, ovatis oblongisve acuminatis, calloso-ciliatis denticulatisve, utrinque viridibus, pedunculis brevibus 2–4-floris, calycis glabriusculi lobis imbricatis.—Flores majusculi. Styli subulati, divergentes, vix apice dilatati.

Hab. Sikkim, altit. 6–8000 feet, *J. D. Hooker*.

A. eriantha, Benth. Foliis brevipetiolatis ovali-oblongis breviter acuminatis minute calloso-dentatis supra glabris subtus ramulisque dense cano-tomentosis, pedunculis brevibus paucifloris, calycis tomentoso-lanati lobis vix imbricatis.—Folia 3–4-pollicaria, petiolo lanato 3–4-lineari. Flores majusculi.

Hab. S. China. Communicated by *Dr. Lindley*.

† *Stachyurus himalaicus*, Hook. fil. et Thoms. *S. Japonicæ* simillimus, differt foliis brevius petiolatis longioribus longe acuminatis, baccis subsessilibus subglobosis obtusis.

perly rejected from that Order, with which it has little connexion. The habit is that of *Actinidia*, but with a rather different inflorescence: the very imbricate æstivation of the calyx or corolla, the fruit, and seeds are those of *Saurauja*; but the stamens are definite, twice the number of the petals. We have, however, definite stamens alternating with the petals in some Euryas and in *Pentaphylax*.

In *Saurauja* we propose to include *Scapha*, Choisy, distinguished only by the number of parts of the gynœcium, which varies from three to five in many Ternstrœmiaceous genera, and *Draytonia*, A. Gray, also separated only by a character equally inconstant in the Order—the union of the styles, which in most Saurаujas are separated to the base, or nearly so. In *S. nepalensis*, DC., they are, however, united at least half-way up; and there is no other character or habit to distinguish either *Scapha* or *Draytonia*.

The *Gordonieæ* of Choisy include *Stuartia, Schima, Gordonia, Hæmocharis*, and *Camellia*. They have the inflorescence, calyx, and corolla of *Ternstrœmieæ* proper, but the stamens usually more numerous, the anthers versatile, and the capsule loculicidally dehiscent. The embryo is usually straight, with little or no albumen, and the cotyledons much larger than in *Ternstrœmieæ* proper; but in *Schima* the embryo is very much curved, and in both *Stuartia* and *Schima* there is certainly more or less of albumen. Adding to the above the genus *Pyrenaria*, Blume (or *Eusynaxis*, Griff.), which is somewhat exceptional on account of its drupaceous fruit, we have six well-characterized genera, all (except, perhaps, *Hæmocharis*) readily distinguishable by their flowers, fruit, or seeds.

We follow A. Gray in reuniting *Malachodendron* with *Stuartia*. *Schima*, as observed by Choisy, is one of the most distinct of the group, in calyx, corolla, ovules, fruit, and seeds. It has been thought by some Indian botanists to be the typical *Gordonia* as represented by *G. floribunda*, Wall. (which is *Schima Noronhæ*, Reinw.); and this is one reason why the true Gordonias have been so frequently proposed as new genera. *Carria*, Gardn., *Polyspora*, Don, *Antheischima*, Korth., and *Dipterospermum*, Griff., have all the characters of the typical *Gordonia lasianthus*, except that the cotyledons are quite flat, not undulate (rather than folded) as they are in that species alone as far as hitherto known. All these species have the inner sepals the largest, and the outer petals the smallest, the sepals forming a gradual passage from the bracts to the petals. All have pendulous ovules, an oblong capsule, and the seeds winged on the upper end, as in *G. lasianthus*. *Hæmocharis*

has the same character also; but instead of the single style of *Gordonia*, the summits of the carpels form distinct protuberances with sessile stigmas, or pass into short diverging styles. It is true that the entire or divided styles are not available for generic characters in *Saurauja*, *Cleyera*, *Eurya*, *Stuartia*, *Pyrenaria*, *Archytæa*, &c.; but between *Gordonia* and *Hæmocharis* the difference in the styles is somewhat more marked, and accompanied through several species by some general differences in habit; and the two genera, though very closely allied, may still be kept up. As to the difference between *Hæmocharis* and *Laplacea* as attempted to be established by Choisy, or that between *Laplacea* and *Cloroschima* (united under *Laplacea* by Choisy) as put forward by Korthals, I confess that neither the study of the characters given, nor of the specimens or plates themselves, enables me to comprehend them.

The genus *Camellia* has been lately carefully monographed by Seemann in his above-mentioned paper. He admits that the separation of *Thea* as limited by the older authors is untenable, Griffith and others having already proposed its reunion with *Camellia*; but by transferring to it three or four species hitherto reckoned as Camellias, Seemann has obtained more precise limits for *Thea*, which he maintains as a genus. To me it appears that the whole group forms a much more natural and better-characterized genus, having the flowers of *Gordonia* with a well-marked capsule and seed, and that Seemann's genus *Thea* is better classed as a distinct though somewhat artificial section of it.

The *Bonnetieæ* of Choisy, comprising *Bonnetia*, *Archytæa*, *Mahurea*, *Kielmeyera*, and *Caraipa*, have the most right to be considered as a suborder, differing from all the three foregoing tribes in inflorescence, in the shape and æstivation of the petals, and in their septicidal capsule. The anthers are versatile as in *Gordonieæ* and *Sauraujeæ*, the seeds almost or quite without albumen, and the embryo always straight, with the cotyledons rather less developed than in *Gordonieæ*. The genera are all remarkably well characterized, the differences in the ovules alone being generally sufficient. Choisy says, indeed, that the ovules are always pendulous or horizontal; but I find them erect, linear, and imbricate in several series in *Bonnetia* and *Archytæa*; linear and imbricate in several series, but pendulous, in *Mahurea*; broad and imbricate downwards in two opposite rows in *Kielmeyera*; two only and pendulous in *Caraipa*, which we would reduce to the alternate-leaved species*. *Bonnetia* and *Archytæa*, which are similar to each other

* See Note A, at the end of this paper.

in their ovules, and generally in habit, differ in their stamens (free in the former, 5-adelphous in the latter) and in the capsule (dehiscent from the apex downwards in *Bonnetia*, from the base upwards in *Archytæa*). In these respects, as well as in every other, except the free styles, *Ploarium*, Korth., agrees so well with *Archytæa*, that Choisy is quite justified in uniting them.

To the above genera we would add, as somewhat anomalous members of the tribe of *Bonnetieæ*, two with opposite leaves:—*Marila*, which has the ovules and anthers of *Mahurea*, but with a less perfectly convolute corolla and a long narrow capsule; and *Haploclathra*, a genus we would propose for the two opposite-leaved Caraipas. Choisy indeed considers the leaves as falsely opposite; but in all the specimens I have seen they are as truly so as in *Marila*. These two species differ likewise from *Caraipa* in their long linear erect anthers without terminal glands, in their single erect ovules, and in the endocarp of the capsular valves not separable from the epicarp.

To the two "familles principales" into which M. Choisy distributes the above four tribes, he appends the three "familles secondaires," *Visneaceæ*, *Ixionantheæ*, and *Pyrenarieæ*. I do not clearly see the precise meaning he attaches to the term "familles secondaires," nor the exact position he claims for them in the series of Natural Orders; but I presume they are intended to be either groups of genera having most of the characters of the "famille principale" to which they are appended, but differing in some one character considered as essential although artificial, or groups naturally distinct from the "famille principale," but too small or too nearly connected to take up an independent position in the linear series. If these views are correct, the course we adopt is in the first case to embody such artificially separated genera with the "famille principale" as exceptional or anomalous members of it, and in the latter case append them to the Order as "genera affinia."

The first of the above groups, the *Visneaceæ*, consists of *Anneslea* with two species, and *Visnea* with one. These are *Ternstrœmieæ* proper, in their habit, foliage, inflorescence, flowers, fruit, and seeds, with the single exception of the ovary being more or less immersed in the thick torus, which enlarges with the base of the calyx, so that the fruit becomes more or less inferior. This circumstance would seem indeed to remove these plants altogether from *Thalamifloreæ*; but on examination it will be found to be of less importance than it appears at first sight. It may be com-

pared rather to the insertion consequent on the enlarged torus in *Nymphæaceæ*, *Calycantheæ*, and others, than to the true calyciflorous insertion, where the staminiferous disk is connate with the calyx-tube beyond where it has separated from the ovary. We therefore have no hesitation in incorporating *Anneslea* and *Visnea* in the tribe of *Ternstrœmieæ* proper.

The *Ixionantheæ* are made to consist of three genera, *Ixionanthes*, *Ochthocosmus*, and *Pentaphylax*, supposed to differ from *Camelliaceæ* chiefly in their definite stamens. But, except in this one respect, *Pentaphylax* has less affinity with *Ixionanthes* than with any one genus of true *Ternstrœmiaceæ*. It is indeed so closely connected with *Eurya*, that it can only be removed from its proximity *invitâ naturâ*. The habit, inflorescence, floral envelopes, insertion of the stamens, ovary, seeds, and embryo are the same; and even in the number of stamens, we have some species of *Eurya* itself in which it is reduced to five. The only differences are in the shape of the anthers (which is yet nearer to that of *Ternstrœmieæ* than to that of the other tribes), and in the fruit (less fleshy and loculicidally dehiscent, as in *Gordonieæ*). We therefore place it at the end of the tribe of *Ternstrœmieæ* proper, forming a connecting link between them and the *Gordonieæ*.

Ixionanthes and *Ochthocosmus* had already been indicated by Planchon as forming a distinct group; but he has never published his views as to their affinities. The insertion of the corolla and stamens in *Ixionanthes* is so decidedly perigynous—the persistent corolla, the stigma, the embryo, the inflorescence, and other characters are so different from what we observe in *Ternstrœmiaceæ*, that its removal from that Order is no longer doubtful. Its affinities must probably be sought among the Calyciflorous orders allied to *Saxifrageæ*, and I therefore reserve their discussion for a future occasion. *Ochthocosmus*, including the African species lately proposed by Klotzsch as a distinct genus under the name of *Phyllocosmus* (Kl. in Schönl. Nachl. p. 232, t. 2), is much less perigynous; but on the whole its connexion with *Ixionanthes* is so obvious, that its general affinities must be governed by those of the latter genus. It must be remembered also that the degree of perigynous expansion of the staminal disk is very variable in all the groups connected with *Saxifrageæ*.

The *Pyrenarieæ* of Choisy are supposed to consist of two genera, *Pyrenaria* and *Calpandria*, distinguished from *Gordonieæ* only by their so-called bony seeds. These seeds are, however, really not harder than in *Camellia* itself, to which genus Seemann has not

unaptly reduced *Calpandria*. *Pyrenaria* forms an excellent allied genus, in the same tribe of *Gordonieæ*, with the habit, inflorescence, and flowers of *Gordonia*, but well characterized by its drupaceous indehiscent fruit, which is exceptional in the tribe, and by its cotyledons very much more folded than even in *G. lasianthus*.

The *Marcgraviaceæ* of Jussieu are a small group of plants which do not appear to have been hitherto brought into direct comparison with *Ternstrœmiaceæ*, but which seem to me to be so closely connected with the tribe of *Ternstrœmieæ* proper, as to be necessarily included in the same family. Botanists have probably been misled by the singular manner in which the petals of the supposed typical genus *Marcgravia* are consolidated so as to conceal their æstivation, and by the admixture of the characters of *Antholoma*, which has been so unaccountably associated with the group. Taking the genera *Norantea* and *Ruyschia* to explain such points as are concealed from us in *Marcgravia*, we have little or nothing in the sepals, petals, stamens, ovaries, and (sessile) stigmas to distinguish them from *Adinandra*. The ovules, it is true, are ascending, not horizontal or pendulous—a diversity which we have seen to occur in other cases between closely allied genera in the Order. The seeds also, as far as known (only in *Ruyschia*), are less curved than in *Ternstrœmieæ* proper; and their embryo is thicker, although cylindrical, with the cotyledons continuous with, and no thicker than the radical, as in *Ternstrœmieæ* proper. These slight differences, with their terminal racemose inflorescence and singular bracts, will suffice to characterize a tribe, but not, in our opinion, a distinct Order.

Antholoma, an Austro-Caledonian plant to which I have alluded as having been so unaccountably included in the group of *Marcgravieæ*, is known only from Labillardière's figure and description. Notwithstanding a discrepancy in the latter, probably typographical, between the generic character and specific description, an inspection of the figure suggests to us the probability of its being a genuine species of *Bassia*, rather than an Elæocarpous genus as conjectured by Planchon.

Cochlospermum, Kunth, *Microsemma*, Labill., *Leucoxylon*, Blume, *Quiina*, Aubl., and *Pœcilandra*, Tul., which have been severally associated with *Ternstrœmiaceæ*, have been now removed by Planchon, Choisy, and others. *Catostemma*, a genus which I published from specimens of Schomburgk's, has some points of affinity with the Order, but, from its decidedly perigynous stamens and petals,

must be enumerated amongst *Calycifloræ* of doubtful affinity, until more complete specimens shall have been obtained. Of the three supposed new genera of *Ternstrœmiaceæ* recently published by Turczaninow, *Tristylium* is a *Cleyera* with the styles more deeply divided than usual, and *Kowalewskia* is a common Mexican *Clethra*. *Hypopogon* is unknown to me; but the character given can scarcely be reconciled with that of *Ternstrœmiaceæ*, and it must remain among the genera insufficiently known until it shall have been again examined, more especially as it is published in the same paper where a *Fagus* is given as a new genus of *Sapindaceæ*, a common *Glycosmis* as a new *Marignia*, &c.

Note A, referred to from page 57.

The following are the species of *Caraipa* more or less known:—

1. C. costata, *Spruce*. Foliis ovatis v. ovali-oblongis breviter acuminatis subtus elevato-penniveniis venulis transversis conspicuis ad costam ramulisque ferrugineo-pubescentibus, panicula divaricata pauciflora, petalis tomentosis, ovario villoso.—Arbor 100-pedalis, succo lacteo. Folia 4–5 poll. longa, 2–3 poll. lata, subtus insigniter venosa. Flores majusculi, albi, extus virentes.

Hab. In the forests of Panuré on the Rio Uaupès, an affluent of the Rio Negro in Venezuela on the borders of Brazil, *R. Spruce*, n. 2587.

2. C. Richardiana, *Camb. Mém. Ternstr. et Gutt.* p. 46. Glaberrima, foliis oblongis v. ovali-oblongis breviter acuminatis subtus elevato-penniveniis concoloribus, floribus paucis subcorymbosis, petalis ovarioque glabris, capsula rhomboidea triquetra elongata.

Hab. Cayenne, British Guiana, *Rob. Schomburgk*, 2nd coll. n. 175; *Rich. Schomburgk*, n. 131.

3. C. grandifolia, *Mart. Nov. Gen. et Sp.* i. p. 106. Glaberrima, foliis oblongo-lanceolatis acuminatis subtus elevato-penniveniis glaucis, paniculis oblongis brevibus confertifloris, ovario vix tomentello, capsula pyramidato-triquetra elongata.—Arbor parva, ramis debilibus, succo lacteo. Folia sæpe pedalia, etsi in speciminibus nonnullis vix 4-pollicaria. Paniculæ floridæ vix 2-pollicares, fructiferæ magis evolutæ. Flores majusculi, alabastro subgloboso. Capsula 18–20 lin. longa, acuta. Semina 15 lin. longa, plano-compressa. Embryo ut in icone *C. Richardianæ*.

Hab. On the Amazon, *Martin*; near Barra in the gapò of a forest-stream, *R. Spruce*, n. 1835; and on rocky banks of streams, *R. Spruce*, n. 1395. Distributed as *C. calophylla*, sp. n. By some mistake in his notes, M. Choisy refers this synonym to the *C. glabrata*.

4. C. GLABRATA, *Mart. Nov. Gen. et Sp.* i. p. 105, t. 65.
Hab. North Brazil. A single specimen of Mr. Spruce's from Caripi agrees very well with Martius's figure and description; the leaves are much broader in proportion to the length than in *C. grandifolia,* the panicle more lax, the flower larger.

5. C. RACEMOSA, *Camb. Mém. Ternstr. et Gutt.* p. 47.
Hab. Cayenne, *Richard.* I have seen no specimen precisely answering to Cambessèdes' description.

6. C. TERETICAULIS, *Tul. Ann. Sc. Nat. Par.* sér. 3. viii. p. 341.
Hab. British Guiana, *Rob. Schomburgk,* 2nd coll. n. 682; *Rich. Schomburgk,* n. 925. This agrees with the description of *C. racemosa* in foliage, but not in inflorescence. It has also smaller flowers, and two ovules in each cell.

7. C. ANGUSTIFOLIA, *Aubl. Pl. Gui.* i. p. 564, t .224. f. 4.—*C. variabilis,* Camb. Mém. Ternstr. et Gutt. p. 48.
Hab. Cayenne, *Martin.*

8. C. SUAVEOLENS, *Planch. MS.* Foliis oblongis obtusissimis glabris subtus glaucescentibus tenuiter penniveniis, paniculæ tomentellæ ramis laxe cymiferis, alabastro ovoideo ovarioque tomentellis (capsula brevi). —Arbor parva. Folia 2½–4-pollicaria. Inflorescentia *C. fasciculatæ* nisi laxior, floribus paucioribus, multo majoribus. Alabastra ovoidea, 4 lin. longa. Flores albi, suaveolentes.
Hab. British Guiana, *Rob. Schomburgk.* A few specimens only, gathered in his last expedition to the southern frontier, and not generally distributed.

9. C. FASCICULATA, *Camb. Mém. Ternstr. et Gutt.* p. 49. Foliis ovalibus oblongisve obtusis acuminatisve glaberrimis subtus glaucis, paniculæ floribundæ glabriusculæ ramis laxe cymiferis, alabastro subgloboso ovarioque tomentellis, capsula brevi.—Folia 2½–4-pollicaria. Alabastra 5 lin. diametro.
Hab. Guiana and North Brazil. I am inclined to unite with this species the *C. densifolia,* Mart. Nov. Gen. et Sp. i. p. 105; *C. laxiflora,* Benth. in Hook. Lond. Journ. Bot. ii. p. 364, gathered by Rob. Schomburgk on the Rio Quitaro, 1st coll. n. 583; and the three following numbers of Mr. Spruce's collection: viz., n. 2016, distributed as *C. laurifolia,* a much branched tree, 20 to 30 feet high, abundant in the gapò of the Rio Negro from Barcellos upwards, called by the natives *Tamacoarí do gapò*; n. 2515, distributed as *C. myrciæfolia,* sp. n., a tree sometimes 70 feet high in the gapò of the Rio Uaupès, an affluent of the Rio Negro; and n. 2580, distributed under the same name, a small tree of 20 to 30 feet, called *Tamacoarí-miré* in the "lingua geral." To this Mr. Spruce appends the following memorandum:—

"From a closely allied species with larger leaves, frequent on the Rio Negro about Castanheiro and St. Isabel, but of which I have not seen flowers or fruit, is extracted the celebrated balsam of *Tamacoarí,* alluded

to by Martius in his 'Systema Mat. Med. veget. Bras.,' after Copaifera, in these words: 'Neque de celebri Balsamo *Tamacoaré* Paraensium certi quid afferre valeo.' The balsam is extracted from the tree in the same manner as oil of *Cupaúba* (Capivi); that is, by making an incision to the very heart, from which the balsam slowly distils; and in so small a quantity does it exist that some days are required to fill a small bottle. The best mode of collecting it is to put cotton into the hole, and when it is saturated, to squeeze out the balsam. Tamacoarí has the colour of old port wine, and the consistency of olive oil. Its great use is in the cure of itch, for which it is a more certain specific than sulphur, and has the further advantage of possessing no disagreeable odour. A single application cures the most inveterate itch in twenty-four hours, as it were by magic. It is equally efficacious in destroying lice in the heads of children. It is worth remarking that the Indians on the Amazon and its tributaries have from time immemorial been aware that itch is caused by an insect, which they call *Curúba*; and so fine are they of sight, that with the point of a palm-prickle (as, for instance, of the Tucumá) they will follow the track of the Curúba under the skin until they reach the insect itself, which they extract.

"The milk of the bark and alburnum of *Tamacoarí*, when applied to the skin, causes it to burst in blotches."—*R. Spruce.*

The three supposed species described and figured by Aublet from the foliage only, the flowers and fruit being unknown, must be wholly omitted. With regard to two of them, *C. parviflora* and *C. latifolia*, I can form no plausible guess; the third, *C. longifolia*, from its stipules, is probably a *Licania*, or some allied Chrysobalanaceous plant. To the same genus evidently belong the specimens without flower or fruit sent by Mr. Spruce from the neighbourhood of Para as those of the *Caraipé* or *Pottery-tree*,—*Caraipé* being a native name given to several species of *Licania*, although adopted by botanists for our Ternstrœmiaceous genus.

The four following *Ternstrœmiaceæ* in Mr. Spruce's collection, all belonging to the same tribe of *Bonnetieæ*, appear to be quite new.

1. Bonnetia paniculata, *Spruce.* Foliis obovatis v. obovali-oblongis, panicula laxe per anthesin ebracteata, sepalis petalisque oblique orbiculatis, stylo 3-fido.—Arbor 20–30-pedalis, ramosa, cortice rugosa. Specimina siccando odorem aromaticum scatent, ex Spruce. Folia 4-pollicaria, $1\frac{1}{2}$–2 poll. lata. Panicula terminalis, semipedalis, pyramidata, ramis compressis. Bracteas nullas vidi, v. caducissimæ sunt, v. plane desunt. Pedicelli crassi, sæpius terni, 3–4 lin. longi. Petala semipollicaria, extus rosea, intus alba.

Hab. Tavaloso, in the Maynensian Andes, near Tarapoto, *R. Spruce*, n. 4809.

2. Bonnetia parviflora, *Spruce.* Foliis oblongis v. obovali-oblongis, panicula laxa per anthesin ebracteata, sepalis petalisque oblique oblongis, stylo 3-fido.—Arbor 20-pedalis, ramosissima, late patula, præcedenti affinis. Folia angustiora. Flores minores, et sepala et petala multo angustiora: hæc rosea sunt.

Hab. On the sides of mountains, near Tarapoto, *R. Spruce*, n. 4239

3. MAHUREA CASIQUIARENSIS, *Spruce*. Foliis late oblongis acuminatis elevato-penniveniis glabris, panicula angusta tomentosa, sepalis orbiculatis quam petala multo brevioribus.—Arbor parva, ramulis longis fragilibus foliosis, tota inflorescentiis exceptis glaberrima. Folia 4–8-pollicaria, petiolo 6–9 lin. longo, rigida, conspicue elevato-pennivenia et transverse venulosa. Paniculæ 4–6-pollicares, ramulis brevibus subtrifloris. Sepala coriacea, tomentosa, exteriora vix 2 lin., intima fere 4 lin. longa. Petala parum inæqualia, circa 6 lin. longa, rosea, extus minute tomentella. Capsula obtuse trigona, semipollicaris.

Hab. In sandy woods at the foot of Mount Guanari on the Casiquiare in Venezuela, *R. Spruce*, n. 3161.

4. MARILA NITIDA, *Spruce*. Foliis ovatis v. ovato-oblongis acuminatis coriaceis glaberrimis nitidis, racemis vix tomentellis, pedicellis quam sepala brevia obtusa sublongioribus.—Arbor parva, 18-pedalis, parum ramosa. Ramuli ancipites, novelli tomentosi, mox glabrati. Folia 6–10-pollicaria, basi rotunda, costa subtus acute prominente, petiolo compresso rigido semipollicare. Racemi foliis breviores. Pedicelli 2 lin. longi. Sepala 5, 1½ lin. longa, obtusissima, subæqualia. Petala non vidi. Stamina sepalis breviora. Capsula 4–6 lin. longa, in stylum 1 lin. longum abiens. Seminum alæ aureæ.

Hab. In the Maynensian Andes, near Tarapoto, about half-way up the Campane Mountain, *R. Spruce*, n. 4332.

The two species of *Haploclathra* above alluded to as gathered by Mr. Spruce are:—

1. H. PANICULATA (*Caraipa paniculata*, Mart. Nov. Gen. et Sp. pl. i. p. 104, t. 64).

A tree of 50 to 60 feet, with flesh-coloured, sweet-scented flowers. Frequent on the gapò of the Rio Negro from below Barcellos upwards. It supplies the *Mura piranga*, i. e. *red wood*, a timber much prized for cabinet work. *R. Spruce*, n. 1915.

2. H. LEIANTHA (*Caraipa leiantha*, Benth. in Hook. Lond. Journ. Bot. ii. p. 364).

A tree of 30 to 50 feet, with a white milky juice. Petals white, with pink edges. Frequent throughout the gapò of the Rio Negro. *Rob. Schomburgk*, 1st coll. n. 935; *R. Spruce*, n. 1886.

Having above alluded to the remarkable connecting links between this Order and the generally widely distinct one of *Dilleniaceæ*, I am induced to take this opportunity of noticing a species of the latter Order contained among Mr. Spruce's plants, which requires a few words of comment. I allude to the genus *Curatella*, Linn., now consisting of two species, both of which were gathered by that zealous collector. One of them is the very common *C. americana*, Linn., which includes the *C. çambaiba*, A. de St.-Hil.; the other, distributed as *C. glabra*, Spruce, under the no. 2279, from the gapò of the Rio Negro at the Falls of S. Gabriel, proves to be the

Pinzona coriacea, Mart. et Zucc. in Regensb. Flora, 1832, ii. Beibl. p. 77. It is a shrub or twiner, with the foliage, inflorescence, and flowers of *C. americana*, but glabrous or nearly so; the fruit is also the same in its peculiar shape and connexion of the carpels, but it is rather more succulent and apparently indehiscent, although, according to Spruce, it is green, and scarcely a true berry. This circumstance, unaccompanied by any other difference in habit or character, appears to us quite insufficient to separate generically two plants forming together in both these points a marked group among *Delimeæ*. On the same principle we are not inclined to adopt the genus recently proposed by Triana, under the name of *Ricaurtea*, for certain species of *Doliocarpus*, in which, with the habit, inflorescence, and flowers of that genus, the fruits, although red as in the other species, are less succulent than in them, and open in two valves when quite ripe. Important as is in most cases the distinction between a berry and a capsule, because usually accompanied by other characters, we cannot consider it so essential a one *per se* as to be always absolutely generic *invitâ naturâ*.

Notes on the Germination of certain species of CYRTANDREÆ. By C. W. CROCKER, Foreman of the Propagation Department, Royal Gardens, Kew. Communicated by J. D. HOOKER, Esq., M.D., F.R.S., F.L.S.

[Read April 19th, 1860.]

ABOUT two years ago I was much struck by the singular mode of growth of *Streptocarpus polyanthus*, Hook. (a plant then newly introduced from Natal), and determined to watch its progress from the earliest stage. At that time we had but few seeds of it, and I but little time to attend to them. I saw enough, however, to stimulate my curiosity. Within the last few months I have had the opportunity of again observing the germination of this species and also of several others allied to it; and as this process appears to me to be different from anything I have seen in other plants, and as I find no mention made of it in any of the books to which I have access, I will briefly describe the peculiarities it exhibits.

In its adult state, *Streptocarpus polyanthus* consists of one cordate-oblong, rugose, downy leaf, about a foot in length, undulate-crenate at the margin. This leaf is one of the cotyledons, which has expanded to so remarkable a degree and become quite foliaceous. It lies flat—closely pressed upon the surface of the soil—but without attempting to form roots. The flower-scapes rise from the sinus of this leaf, each bearing a panicle, which is generally once or twice bifid, and produces a pair of flowers in the fork.

The seeds, which are exalbuminous, are about one-fiftieth of an

inch in length, fusiform, and taper to a point at each end. The cotyledons are quite equal in size while enclosed in the seed, and for the first few days after germination, which usually takes place in about a week from the time when they are sown. Soon after bursting the testa, which is usually carried up attached to one of the cotyledons, these assume a greenish colour. They both grow in an equal degree for the first few days; but by the end of a week, one has increased to more than double the size of the other, and this still continues to grow until the plant has reached the size above mentioned. In fact, no other leaf is generally produced; out of several dozen plants I have examined, there has not been the slightest attempt to produce a plumule. In one or two instances, I have observed a small abortive leaf produced in the sinus of the large cotyledonary leaf; this is always in a reversed position, and does not become more than an inch in length.

This peculiar mode of growth, although best seen in the plant above mentioned, is, to a certain extent, exhibited in some other and nearly-allied species, particularly in *Streptocarpus* (*Didymocarpus*) *Rexii* and *S. biflorus*. Both of these produce two or three true leaves, which are, however, smaller than the one enlarged and foliaceous cotyledon, which is much developed, and in *S. biflorus* is always double the size of any of the leaves afterwards produced.

All the plants above named are natives of the southern part of Africa; it would be interesting to follow out the inquiry, and see whether the same peculiarity is shared by members of the Order from other countries. Some seeds of *Chirita Moonii* sent by Mr. Thwaites, of the Botanic Garden, Peradenia, Ceylon, to Dr. Hooker, appear to exhibit it, but in a much less degree. The cotyledons are quite equal at first; but I see that after a week or ten days' growth one of them is about a third larger than the other. The plants of this division of *Gesneraceæ* abound principally in the humid valleys of the eastern tropics; and among them are several monophyllous species, which, judging from analogy, may be expected to follow the same plan of growth as *Streptocarpus polyanthus*. Unfortunately they have not yet been introduced into our European gardens.

Description of Plate IV.

Fig. 1. *Streptocarpus polyanthus*. Seeds (about $\frac{1}{50}$ in. long), and embryo with its testa removed.

Fig. 2. *S. Rexii*. Germinating embryo, removed from the testa, which it was about to burst; the cotyledons are tinged green.

Fig. 3. More advanced stage—the cotyledons nearly equal.

Figs. 4, 5. *S. biflorus* (with nat. size of larger cotyledon). Cotyledons already very unequal.

Fig. 6. The same.

Fig. 7. The same, *a*: scar of a detached leaf (*á*); *b*, smaller cotyledon.

Fig. 8. *S. polyanthus*: *a*, inverted leaf; *b*, young undeveloped scape; *c*, flowering scapes; *d*, enlarged foliaceous and persistent cotyledon.

Notes on *Anonaceæ*. By George Bentham, Esq., F.L.S.

[Read May 3rd, 1860.]

The history, affinities, and generic distribution of this very natural family have been so fully discussed by Hooker and Thomson in their 'Flora Indica,' that little remains to be observed on the Asiatic species, from the materials we at present possess; but there is still some degree of confusion with regard to the American ones. When Martius, in an early part of the great 'Flora' published under his editorship, described the Brazilian *Anonaceæ*, the principles more recently adopted for their classification had not yet been proposed; and although the principal American genera, *Guatteria*, *Duguetia*, *Anona*, *Xylopia*, *Rollinia*, *Bocagea*, and *Anaxagorea*, remain pretty nearly within the limits there ascribed to them, the generic characters of some of them, as well as their classification in tribes, require modification, and the Uvarias of the 'Flora Brasiliensis' do not at all correspond to the Asiatic genus of that name. In our 'Genera Plantarum,' Dr. Hooker and myself purpose following, with some slight modifications, the tribes proposed in the 'Flora Indica,' which, although somewhat artificial, are the best which have suggested themselves. We would, however, suppress the *Anoneæ*, uniting them with *Xylopieæ*; for the character derived from the carpels consolidated in the fruit is variable both in *Rollinia* and *Duguetia*. We would also somewhat extend the character of *Mitrephoreæ*, so as to include *Oxymitra*, *Phæanthus*, and *Monodora*, in which the inner petals, although not unguiculate, are erect and connivent or coherent, whilst the outer dissimilar ones are spreading, as in other *Mitrephoreæ*. The *Guatterieæ*, which cannot include the genus *Guatteria* as originally constituted for the American species, must take the name of *Unoneæ*; and *Popowia*, admitted to be intermediate between these *Unoneæ* and the *Mitrephoreæ*, appears to us to be better placed in the former than in the latter tribe.

The true American Guatterias, numerous in species, all belong to the tribe of *Uvarieæ*, as characterized by the imbricate æstivation of the petals. The inner petals are very decidedly so in all the

species I have seen, although in some few instances the outer petals are scarcely imbricate at the tips, or perhaps truly valvate. In the Asiatic species referred to *Guatteria*, the petals, wherever I have been able to observe them, are strictly valvate, as described in the 'Flora Indica;' but in most cases they open out at so very early a stage, when the bud is still exceedingly small, that it is difficult to find specimens showing the true æstivation. In this respect, as in most others, these Asiatic Guatterias agree with *Polyalthia*, as limited in the 'Flora Indica,' only differing in there being but one instead of two ovules in each carpel—a difference not consdered as generic in the allied genus *Popowia* (perhaps itself a section of *Polyalthia*), nor in *Phæanthus* and some others. We think therefore that these Asiatic species rejected from *Guatteria* may well be considered as forming a section of *Polyalthia.*

The West Indian genus *Oxandra* has the petals very strongly imbricate in the bud, and belongs therefore to *Uvarieæ,* next to *Guatteria,* although, by some inadvertence, Grisebach, in his recently-published Flora of the British West Indian Islands, has followed previous writers in supposing their æstivation to be valvate.

Duguetia belongs also to *Uvarieæ.* It is indeed the only American genus in which the imbricate æstivation had been observed. It should, however, include the *Anona furfuracea,* A. de St.-Hil., which has not only the lepidote surface and imbricate petals of other Duguetias, but the fruit, which had induced its reference to *Anona,* has not the carpels more united than occurs in some other Duguetias, and they are much less so than in any *Anona* whose fruit I have seen.

Asimina, a North American genus, has, like several *Unoneæ,* the petals open at so early a stage of their growth, that their true æstivation had not been well observed on the very few flowers which herbarium specimens generally show ; A. Gray has, however, recently ascertained that they are truly valvate; and the genus therefore belongs to the true *Unoneæ,* and indeed is very near to *Unona* itself, and ought perhaps to be united to that section of the latter genus which have the ripe carpels ovoid and continuous, not constricted between the seeds as in most Unonas. We do not know, however, whether the Asiatic species have the arillate seeds attributed to the American ones.

Porcelia, from South America, united by some with *Asimina,* appears to be nearer allied to *Uvaria* proper ; but the specimens at Kew are not in a sufficiently perfect state to ascertain its characters with precision. The æstivation of the petals, both inner and

outer, is however certainly imbricate, and fixes its place among the *Uvarieæ*, and not with the *Unoneæ*.

A North Brazilian plant which I described in 1843 as *Guatteria heteropetala*, from a specimen of Schomburgk's, and which occurs again in Spruce's collection under the no. 3184 (gathered on the sandy banks of the Vasiva, an affluent of the Casiquiare), must be excluded from that genus and from the tribe of *Uvarieæ*. The outer petals are small and sepal-like, and the inner ones thick, erect, and connivent, as in the Asiatic *Phæanthus*. I felt, indeed, some hesitation whether I should not refer it at once to that genus; but some differences in the consistence of the petals, in the styles, in the habit and country, may warrant the maintaining it distinct, and we have accordingly proposed it as such, under the name of *Heteropetalum brasiliense*.

Uvaria brasiliensis, Vell., described and partially figured in Martius's Flora Brasiliensis, and of which Mr. Spruce gathered a variety with longer peduncles in the woods near Tarapoto, distributed under the no. 4097, is again a very distinct plant, to be removed from *Uvarieæ* and placed under the same subdivision of the tribe *Mitrephoreæ*. The large, thick, concave inner sepals and the many-ovuled carpels are quite sufficient to characterize it as a distinct genus, to which we have given the name of *Cymbopetalum*.

The second species referred to *Uvaria* by Martius is the *Trigyneia* of Schlechtendahl, equally to be removed from *Uvarieæ* on account of the valvate petals, and forming a new genus allied on the one hand to *Unona* among *Unoneæ*, and on the other to *Melodorum* among *Xylopieæ*, but best placed next the former genus, from which indeed it chiefly differs in the small size and orbicular concave shape of its petals. Besides the original *T. oblongifolia*, Schlechtendahl (to which, rather than to *Guatteria Hilariana*, I would refer the *Uvaria hirsuta*, Vell. Fl. Flum. vol. vi. t. 124), this genus will comprise the following three new species:—

TRIGYNEIA MATTHEWSI. Glabra v. partibus novellis minute pilosulis, foliis oblique oblongis acuminatis basi subangustatis vix coriaceis, baccis globosis.—Arbor parva, valde ramosa. Folia 4–5 poll. longa, 1½–2 poll. lata, venis primariis a costa divergentibus obliquis arcuatis utrinque 6–8, supra impressis subtus prominentibus. Petiolus brevissimus. Pedicelli 6–8 lin. longi, in axillis solitarii v. sæpius complures pedunculo brevi communi fulti, infra medium minute bracteolati. Flores albidi, circa 3 lin. diametro. Carpella 5–6. Baccæ globosæ, 4–5 lin. diametro, stipite 2 lin. longo.

Near Tarapoto in Eastern Peru (*Matthews*, no. 1421; *Spruce*, no. 4402).

TRIGYNEIA ANGUSTIFOLIA. Glabra inflorescentia excepta, foliis elongato-oblongis longe acuminatis basi angustatis vix coriaceis, baccis oblongis.—Arbor gracilis, 30-pedalis. Folia 6–8 poll. longa, vix 2 poll. lata, acumine ultrapollicari, venis a costa obliquis utrinque 10–12. Flores albidi, ad nodos defoliatos fasciculati, quam in cæteris speciebus majores, petalis exterioribus 4–4½ lin. longis. Carpella 4–6. Baccæ juniores tomentosæ.

In the gapò of the Rio Uaupès in Venezuela (near the borders of Brazil) (*Spruce*, no. 2567).

TRIGYNEIA GRANDIS. Glabra inflorescentia excepta, foliis oblique ovali-oblongis acuminatis infra medium sublatioribus coriaceis nitidis, baccis oblongis.—Arbor 20-pedalis. Folia 6–9 poll. longa, 2½–3½ poll. lata, rigidiora quam in præcedentibus, venis primariis a costa divergentibus utrinque 7–10. Flores ad axillas fasciculati, albidi, circa 3 lin. diametro, pedicellis semipollicaribus. Baccæ crassæ, 8–9 lin. longæ, stipite 3 lin. longo. Semina orbiculata, depressa.

On the banks of the Lower Casiquiare in Venezuela (*Spruce*, no. 3163).

It is possible that the *Unona lucida*, DeC., a Peruvian plant only known from a fruiting specimen in Jussieu's herbarium (figured in Delessert's Icones, vol. v. t. 89), may be a fifth species of *Trigyneia*.

In the above-mentioned four true species of *Trigyneia* the stamens are closely packed, with the flattened top concealing the cells, as in the majority of *Anonaceæ*. The plant distributed from Mr. Spruce's collection as *Bocagea canescens* has them less close, with an ovate tip, and the cells rather more exposed, nearly as in *Bocagea*; but the petals are strictly valvate in each row, as in *Trigyneia*, whilst in *Bocagea multiflora*, Mart., they are very much imbricate. We have no specimens of the two original species of *Bocagea* (*B. alba* and *B. viridis*, St.-Hil.); and it does not appear from the published descriptions and figure what is their real æstivation; therefore it remains doubtful to which group the name of *Bocagea* should remain attached. Should St.-Hilaire's species correspond with the *B. multiflora* in æstivation, as they do in other characters, the *B. canescens* may be transferred to *Trigyneia*, but as a distinct section, with the following character:—

TRIGYNEIA? CANESCENS. Foliis oblongis breviter acuminatis coriaceis subtus pallidis canescentibusve, pedicellis brevissimis solitariis, staminibus circa 12 ultra loculos ovatis, baccis globosis.—Arbor parva, ramis horizontalibus. Folia breviter petiolata, 2–4 poll. longa, 1–1½ poll. lata, venis parum conspicuis. Pedicelli axillares, 2–3 lin. longi. Flores

albidi, tomentosi, 2 lin. diametro. Ovula in carpellis floridis circa 4. Baccæ globosæ, 1–2-spermæ, tomentosæ, subsessiles, 3–5 lin. diametro.

In damp woods near Tomo on the Guainia (or Upper Rio Negro, above its junction with the Casiquiare), in Venezuela (*Spruce*, no. 3549).

A new species, a congener of *Bocagea multiflora*, may be described as follows:—

Bocagea espintana, *Spruce*. Foliis ovalibus v. elliptico-oblongis glabris nitidis, floribus subsessilibus glabris, ovulis solitariis erectis.—"Arbuscula 12–18-pedalis, trunco brevi vix brachiali, ligno tenacissimo, ramis adscendentibus subpinnatis." Folia subsessilia v. brevissime petiolata, obtusa v. subacuminata, $2\frac{1}{2}$–4-pollicaria, coriacea, reticulato-venosa. Flores albescentes, solitarii v. gemini. Pedicelli brevissimi, bracteis squamiformibus obtecti. Sepala brevissima, orbiculata, concava, glaberrima, duplici serie imbricata. Stamina circa 14, incurva, ultra loculos dorsales parum producta. Carpella 4–6, glabra, sessilia, stylo capitato parvo.

In woods near Tarapoto in Eastern Peru, and along the Huallaga (*Spruce*, no. 4920). The poles used by the Indians for impelling their canoes up the rapids are made of the light tough trunks of this tree (*R. Spruce*).

The plant distributed as *Bocagea leucodermis*, Spruce, remarkable for the white bark of its branches, resembles the *B. espintana* in its glabrous carpels with a single erect ovule in each. It is described as a tree of 40 feet, with long slender branches. The leaves are oblong, with long acumen, four to five inches long, glabrous and coriaceous. The inflorescence is that of *B. multiflora*. I have not seen either the petals or the stamens, and am therefore unable to characterize it more definitely, or absolutely to fix its genus. It was gathered on the river Pacimoni, an affluent of the Casiquiare, and distributed under no. 3352.

Should the original *Bocagea alba* and *B. viridis* prove to have truly valvate petals, they must be associated with *Trigyneia canescens*, as a group intermediate between *Trigyneia* and the group formed of *Bocagea multiflora*, *B. espintana*, and probably *B. leucodermis*, which would in that case receive a new name, and be placed either near *Oxandra* among *Uvarieæ* on account of the æstivation of its petals, or among *Miliuseæ* on account of its stamens.

The species of *Anaxagorea* gathered by Mr. Spruce near Barra do Rio Negro in North Brasil, and distributed under the name of *A. brevipes*, Spruce, no. 1722, does not appear, on further comparison, to be specifically distinct from the *A. acuminata*, A. de St.-Hil., which was again gathered by Spruce on the Casiquiare, and distributed under no. 3291.

The *Hexalobus brasiliensis*, A. de St.-Hil., and Naud. in Ann. Sc. Nat. Par. ser. 2, v. xvii. p. 133, t. 6, evidently differs in several respects from the original species of that genus, which are all African. I have not seen the plant, and some slight discrepancies in the figured analyses of the flower preclude my forming any more precise idea of its affinities.

The collections transmitted by the late Mr. Barter from Western tropical Africa supply a few new species of *Anonaceæ*, amongst which the most remarkable is a second species of *Monodora*. The structure of the ovary of this handsome genus appears to have been in some measure misunderstood. It has been supposed to consist of a single carpel with very numerous ovules lining the whole inner surface of the cavity. It is, however, perfectly centrical and regular, faintly marked outside with numerous longitudinal furrows, and the peltate centrical stigma has as many curvatures or minute radiating lobes. This shows that it is a compound ovary consisting of the union of numerous carpels, the confluence of whose closely-packed placentæ gives the appearance of the irregular dispersion of the ovules over the inner surface.

The two species of *Monodora* may be distinguished as follows:—

1. M. MYRISTICA, *Don, Hook. in Bot. Mag.* t. 3059. Foliis cuneato-oblongis basi obtusis, petalis valde undulatis crassiusculis, interioribus extus medium versus villosis.

2. M. TENUIFOLIA, sp. n. Foliis anguste oblongis basi longe acuteque angustatis, petalis margine crispis interioribus glabriusculis.—Folia quam in *M. myristica* minora, multo tenuiora, et basi nequaquam obtusata. Petala exteriora anguste ovato-lanceolata, 1½-pollicaria, interiora minora quam in *M. myristica*.

Gathered by Mr. Barter at Eppah on the Niger River. He describes it as a shrub of seven feet in height, with deciduous leaves. Flowers very beautiful: the outer petals white at the base, spotted red, brown and yellow towards the apex, and crisped on the margin; the inner ones yellow, with a curious appendage in the centre. In the dried specimens this appendage appears in the shape of a little hairy tuft on the margin near the centre, but it is somewhat irregular in its position, and is probably the effect of the puncture of some insect.

Our Borneo collectors have supplied us with two remarkable new genera, *Disepalum* and *Sphærothalamus*, which are described and figured by Dr. Hooker for the next part of the Transactions of the Society.

Botanical Memoranda. By George Bentham, Esq., V.P.L.S.

[Read May 3rd, 1860.]

1. *Involucre of* Anemone.

The so-called involucre of *Anemone* is generally described as consisting of three, or in some instances more (as in *Eranthis*), verticillate leaves,—an arrangement perfectly anomalous in a group where the leaves are essentially alternate. On carefully examining, however, its insertion in the several species, and comparing it, on the one hand with the floral leaves of some species of *Helleborus*, *Nigella*, &c., and on the other hand with the radical or other leaves of the same species, it will be found that it is usually more or less unilateral, and that it may be considered in fact as a single amplexicaul leaf, divided to the base into three or more distinct segments.

2. *Stigmas of* Papaveraceæ.

There is much confusion in the characters occasionally given to some genera of *Papaveraceæ* in the description of the relation of the stigmas to the placentas, opposite to, or alternating with them. Brown and others have, however, long since pointed out that, as parietal placentas proceed normally from the margins of the carpellary leaves, the stigmatic summits, being central, must necessarily alternate with them; and that when, as in *Cruciferæ*, the stigmatic lobes are immediately over the placentas, each lobe consists of two united moieties of two adjoining stigmas. The manner in which this is effected, and the regular gradation from the alternation to the opposition of the stigmatic lobes and placentas, are beautifully shown in *Papaveraceæ*.

In the tribe of *Romneyeæ*, consisting of *Platystemon*, *Platystigma* (including *Meconella*) and *Romneya*, as also in *Hypecoum*, the stigmas or stigmatic summits of the several carpels remain perfectly distinct and more or less diverging, necessarily, therefore, alternating with the placentas, and showing a first approach to the apocarpous structure exemplified in *Ranunculaceæ*.

In all other *Papaveraceæ* the stigmas (or stigmatic surfaces) of the several carpels are confluent on the extremity of the more or less lobed style, or even the summits of the carpellary leaves are completely united into an entire style, the stigmatic extremity of which forms a clavate, globular, conical or flattened mass, on the surface of which the stigmas form broad radiating or undulating lines. The gradation may be traced through the following genera.

In *Stylophorum* (including *Dicranostigma* and *Stylomecon*) the short lobes of the style are erect and alternate with the placentas, representing, as in the *Romneyeæ*, the distinct summits of the carpellary leaves, but the stigmatic surface runs continuously over the tops of the lobes and across the sinuses, where it is often a little thickened. The backs of the lobes remain bare, and sometimes also the central cavity between the lobes.

In *Bocconia* the lobes also represent the summits of the carpellary leaves, and alternate with the placentas, but they are longer and narrower, the stigmas cover their whole inner face, and are continuous, but without any thickening at the sinus.

In *Hunnemannia* and *Eschscholtzia*, on the contrary, the stigmatic dilatation of the sinus assumes the form of one or two additional lobes at each sinus, either shorter than, or as long as the principal lobes. This gives, in a bicarpellary pistil a 4-lobed or 6-lobed stigma, two lobes alternating with the placentas, the other two or four opposite to them, singly or in pairs.

In the majority of bicarpellary *Papaveraceæ*, such as *Sanguinaria*, *Chelidonium*, some Dielytras and Corydalises, &c., the summits of the carpellary leaves, with their stigmatic margins, are completely united in a more or less clavate tip, compressed from front to back. The backs of the carpellary tips are at the same time free from stigmas higher up than their margins or sinus; we therefore observe only one thick stigmatic line running over the top and down the united margins on each side, and consequently immediately over, or opposite to, the equally marginal placentas.

In *Glaucium* these decurrent lines or stigmatic sinuses are thickened and project laterally, forming the horn-like stigmas opposed to the placentas, more developed in that genus than in any other. Similar lateral projections on a smaller scale may be observed in several species of *Corydalis* and *Fumaria*.

In the pluricarpellary genera *Argemone*, *Meconopsis*, *Cathcartia*, &c., the thickened summits of the carpellary leaves, with their stigmatic margins, are again completely united and connivent, or turned in as it were, the stigmatic margins or sinuses forming the radiating lobes of the stigma opposite the placentas, the bare intervals being the backs of the tips of the carpellary leaves.

This arrangement is still more marked in *Papaver*. On the flat disk of *P. somniferum*, for instance, the radiating stigmas represent the stigmatic margins of the summits of the carpellary leaves, the tips of which unite in the centre of the disk. These rays are therefore over the placentas. Very different is the radi-

ating stigma of *Nuphar*, where each ray belongs to the corresponding carpel, and is over the cell; for *Papaveraceæ* are essentially syncarpous, whilst *Nymphæaceæ* are normally apocarpous.

Generally speaking, in *Papaveraceæ* the erect lobes of the style are the carpellary tips, and therefore alternate with the placentas, whilst the radiating or descending lobes are the thickened sinuses, and are over the placentas. *Adlumia*, however, has appeared to me to be in some measure exceptional: the style is entire, but appears to be flattened in a contrary direction to the usual one; the placentas being opposite the faces and the stigmatic sinuses higher than the real carpellary tips; but I have not had the opportunity of acquiring absolute certainty on this point.

3. *The Species of* Ventilago, *a Genus of* Rhamnaceæ.

There are two common East Indian Ventilagos which have been usually confounded under the name of *V. maderaspatana*, viz.: 1. The original *V. maderaspatana* of Gærtner, in which the adnate remains of the calyx form a small flat disk at the very base of the fruit, and which is common in the southern part of the Peninsula and in Ceylon, extending also to Tavoy; and 2. The species figured by Roxburgh in his 'Plantæ Coromandelianæ' under Gærtner's name: in this the adnate calyx is cup-shaped, the remains of the limb forming a ring or slightly prominent border round the middle of the seed-bearing portion of the fruit. To these I added, in some notes prepared last year on Hong-Kong plants, but now reserved for my 'Flora' of that island, a new species under the name of *V. leiocarpa*. It approaches nearest to Roxburgh's species, but it is more constantly glabrous, the inflorescence does not appear ever to form branching panicles at the summit of the branches, and the fruit is particularly smooth. Some Malacca specimens of Griffith's do not appear to differ in any material respect from the Hong Kong ones, and, what was less to be expected, fine fruiting specimens recently gathered in Western tropical Africa by Barter, as well as the flowering ones we previously possessed from that country, appear to coincide perfectly with the Malacca ones.

I had already written out for press the subjoined diagnoses of the Indian species, when my attention was called to a paper of Tulasne's in the 'Annales des Sciences Naturelles,' where he also points out the hitherto neglected characters derived from the degree of adherence of the fruit, but in which he distinguishes no less than five East Indian species, besides forms which he believes

to be specific, but of which his specimens are insufficient for description. It is, indeed, scarcely possible to give positive diagnostic characters of any *Ventilago* without the assistance of the fruit, and I should have been unable to identify such of Tulasne's Indian ones as he had not seen in fruit, had not the rich materials in the Kew Herbaria afforded me specimens corresponding to those he described. He is perfectly correct in the one he identifies as the original species of Gærtner, but, from a careful comparison of all our specimens, I should have little hesitation in uniting his *V. macrantha*, *V. calyculata*, *V. Smithiana*, and *V. sulphurea* with the common northern one figured as above mentioned by Roxburgh. The greater or less prominence of the rim of the calyx seems to depend much on the degree of maturity of the fruit, although, even in Strachey and Winterbottom's specimens, it never is so lax as in the *V. leiocarpa*. The variations in the size of the flowers and length of the pedicels is often a consequence of the subdiœceous nature of the species, the semifemale flowers being usually larger, fewer, and on longer stalks than the semimale ones. The pubescence and dentation of the leaves are also variable even on the same specimens, although, no doubt, in so widely-spread a species there must be slight local varieties of more or less permanence. With regard to the name of the species, as it certainly is not Gærtner's plant, I have selected that of *V. calyculata* as being the one of the four proposed by Tulasne which appears the most appropriate. The diagnoses of the three species might then stand as follows:—

1. V. MADERASPATANA (*Gærtn. Carp.* i. 223, t. 49, non *Roxb.*, *Wight, Ic.* i. t. 163). Tenuiter tomentella v. glabrescens, florum fasciculis in racemos interrupte paniculatos aphyllos dispositis v. inferioribus axillaribus, floribus cano-tomentellis, fructu tomentello v. glabrescente basi calyci brevissime adnato insidente.—*V. bracteata*, Heyne in Wall. Catal. no. 4269.

Hab. In Ceylona, in Peninsula Indiæ orientalis, in Mergui (*Griffith*), ad Moulmeyn (*Lobb.*).

2. V. CALYCULATA (*Tul. in Ann. Sc. Nat. Par.* ser. 4. viii. p. 124). Cano-tomentosa v. pubescens, vix demum glabrescens, florum fasciculis in racemos paniculatos aphyllos dispositis v. imis paucis axillaribus, floribus cano-tomentellis v. pubescentibus, fructu tomentoso v. flavicante in media nuce calycis limbo parum prominulo annulato.—*V. maderaspatana*, Roxb. Pl. Corom. i. 55, t. 76.—*V. sulphurea* et *V. Smithiana*, Tul. *l. c.*, p. 125.—*V. macrantha*, Tul. *l. c.*, p. 123.

Hab. In India orientali, præsertim in montosis Indiæ centralis et borealis a Bombay usque ad Khasya, frequens.

3. V. LEIOCARPA (*Benth. Fl. Hong-Kong*). Glabra, florum fasciculis axillaribus v. summis paucis aphyllis, floribus glabris, fructu glaberrimo nitido in media nuce calycis limbo prominente annulato.—*V. maderaspatana*, Benth. in Kew Journ. Bot. iii. p. 42, non Gærtn.

Hab. In Chinæ australis ins. Hong-Kong; in Malacca, *Griffith*; in Africa occidentali tropica ad flum. Niger, *Barter*.

Among the remaining published species, *V. denticulata*, Willd., appears to be founded on those specimens of *V. maderaspatana* (or *V. calyculata?*) which have toothed leaves. *V. oblongifolia*, Bl., is too imperfectly described to be recognized; *V. viminalis*, Hook., from Australia, is a very distinct species. *V. bombaiensis*, Dalz., cannot be determined for certain without the fruit; from inspection of his specimens, I am led to suspect that they may have been taken from side-shoots of *V. calyculata* with the inflorescence abnormally axillary. *V. lanceata*, Tul., from the Seychelles and *V. leptadenia*, Tul., from Madagascar, appear to be, from his characters, both very distinct. *V. cernua*, Tul., from the Rawack Island (in the Moluccas), seems, from his description, to agree in some respects with my *V. leiocarpa*, but, as the fruit is not known and the station is somewhat distant, I have not ventured to refer my plant to it. *V. vitiensis*, A. Gray, may also be a good species; but here again the fruit is unknown, and until that has been seen there must remain some doubt about it. We have, also, a distinct unpublished broad-fruited species from Mergui (*Griffith*); but the specimens are too incomplete to be described accurately.

4. *The* Memecyla *of Cuming's collections.*

Having had occasion to examine the *Memecyla* collected by Cuming in the Philippine Islands and Malayan Peninsula, which have been published independently, first by Presl, and, since him, by Naudin, I am induced to subjoin their synonymy, for the guidance of those who possess the collection:—

No. 2322 (Malacca, not Philippines).=*M. cæruleum*, Jack, Malay Pl. p. 166.—*M. cordatum*, Wall. Catal, no. 4100, C, D and E, from Singapore and Burma (4100, A and B, together with 4101, being correctly referred by Naudin to *M. amplexicaule*, Roxb.).—*M. lutescens*, Presl. Epimel. Bot. p. 208.—*M. manillanum*, Naud. Ann. Sc. Nat. ser. 3, v. xviii. p. 276.

No. 760 and 889.=*M. Cumingii*, Naud. Ann. *l. c.*, p. 273.—*M. umbellatum*, Presl, Epimel. Bot. p. 208, non Blume.

No. 917 and 1816.=*M. pyrifolium*, Presl, *l. c.*, p. 210 (no. 1816); *M. Cumingianum*, Presl, *l. c.*, p. 209 (no. 917).—*M. clausiflorum*, Naud. *l.c.*, p. 274. The petals remaining closed round the style, from whence Naudin derived his name, appears to be an accidental circumstance, very rare in our specimens.

No. 1445.=*M. ovatum*, Sm., DC. Prod. v. iii. p. 6.—*M. edule*, Roxb., DC. *l. c.*; Wall. Catal. no. 4107.—*M. grande*, Wall. Catal. n. 4109.—*M. lucidum*, Presl, Epimel. Bot. p. 209.—*M. prasinum*, Naud. *l. c.*, p. 275; and probably some others of Wallich's catalogue.

5. *A Chinese Species of* Calogyne, *a Genus of* Goodeniaceæ.

In a small collection of Amoy plants transmitted to me by Dr. Hance as having been collected by Mr. C. P. M. de Grijs, is a *Goodeniacea*, curious both as being only the second species of that family, besides the maritime Scævolas, known to grow out of Australia, and, as belonging to the genus *Calogyne*, remarkable for the trifid style, each branch bearing an indusium, and of which one species only, from the coasts of tropical Australia, had been hitherto known. From that species this one differs in its low prostrate habit, short pedicels, and the flowers scarcely above half the size, with a very short tube. It may be technically characterized as follows:—

Calogyne chinensis, humilis, prostrata, pilosula v. glabrescens, foliis linearibus dentatis, pedicellis axillaribus brevibus reflexis, corollæ tubo vix calyce longiore.—Caudex (perennis?) brevis, foliatus, ramos emittens prostratos semipedales. Folia radicalia conferta, 1–1½-pollicaria, ramealia dissita, breviora. Pedicelli alii in caudice intra folia subradicales, alii ad axillas foliorum ramealium solitarii, 2–3 lin. longi. Flores vix 4 lin. longi. Stylus trifidus omnino *Calogynæ*, ovarium tamen 2-loculare videtur. Capsula certe bivalvis bilocularis. Semina in quoque loculo plurima orbiculata compressa ut in *C. pilosa*, Br. Flores odorem *Anthoxanthi* spirare dicuntur.

Hab. Near Amoy, *De Griis* (Hance, n. 1422).

On *Fissicalyx*, a new Genus of *Dalbergieæ*. By George Bentham, Esq., V.P.L.S.

[Read May 3rd, 1860.]

In my Synopsis of *Dalbergieæ* in the supplemental part of the fourth volume of this Journal, p. 17, I referred to a specimen of Fendler's as indicating a new genus with a spathaceous calyx. I

have since then received Mr. Fendler's own specimen of the plant with fully expanded flowers, and, although the fruit is as yet unknown, the calyx and anthers are so different from those of any others of the tribe, that I have no longer any hesitation in characterizing it as a new genus, as follows:—

FISSICALYX, gen. nov. DALBERGIEARUM.

Calycis tubus turbinatus, limbus acuminatus integer v. apice minute denticulatus per anthesin hinc fissus, spathaceus. Petala ad apicem tubi cum staminibus inserta. Vexillum angustum. Alæ eo vix breviores, oblique oblongæ. Carinæ petala subsimilia, paullo minora, libera. Stamina 10, monadelpha, vagina supra fissa. Antheræ versatiles, apice biporosæ. Ovarium breviter stipitatum, biovulatum. Stylus filiformis apice minute stigmatoso.

Species unica, *F. Fendleri*. Arbor. Folia impari-pinnata. Foliola (11) opposita, exstipellata, petiolulata, inferiora ovata, superiora oblonga, acuminata, 3–4-pollicaria, basi rotundata v. subcordata, glabra, membranacea. Panicula terminalis, molliter pubescens. Bracteæ stipulares ad basin ramorum parvæ, sub floribus minutæ. Flores conferti. Pedicelli ad singulas bracteas solitarii v. gemini, vix lineam longi. Bracteolæ parvæ, acutæ, persistentes. Calyx semipollicaris, pubescens, subfoliaceus, apice longe basi brevius attenuatus, summo apice minute penicillatus. Petala aurantiaca, calycem paullo superantia, breviter unguiculata. Vexillum basi complicatum, nec auriculatum nec appendiculatum, erectum, lateribus reflexibus. Alæ et petala carinalia basi hinc rotundato-auriculata.

Hab. In Venezuela, between Turmero and Maracai, at an elevation of 1700 feet.—*Fendler*, no. 2223. The loose fruits distributed with the specimens are evidently mismatched. They are those of a *Guaiacum*.

An Account of the Plants collected by Dr. WALKER in Greenland and Arctic America during the Expedition of Sir FRANCIS M'CLINTOCK, R.N., in the Yacht 'Fox.' By J. D. HOOKER, Esq., M.D., F.R.S., F.L.S., &c.

[Read June 21, 1860.]

ON the termination of Capt. M'Clintock's memorable voyage, the plants collected by Dr. Walker, Surgeon and Naturalist to the Expedition, were placed in my hands by that officer for determination, together with some accurate notes of the localities, and of the temperature of the soil and air to which they are exposed in their native habitats. Though containing no absolute

novelties amongst flowering plants*, Dr. Walker's herbarium is a particularly interesting one, both from the thorough manner in which that officer explored the localities he visited, and from the proximity of one of his stations (Port Kennedy, in the Boothian peninsula) to the magnetic pole. The florula of that province is further important as affording a means of determining the western and eastern limits respectively of several Arctic Western American and Greenland plants. A glance at the northern circumpolar chart shows that the peninsula of Boothia is placed in a very central position amongst the Arctic American islands, the botany of the eastern, western, and northern of which has been investigated by many indefatigable and intrepid officers, whilst of the central districts, and especially of Boothia itself, nothing has hitherto been known.

The total number of species brought by Dr. Walker is about 170, of which nearly 100 are flowering plants. Of these, only 46 flowering plants, and 58 Cryptogamic, were collected at Port Kennedy; most of the remainder were gathered, either on the coasts of Greenland—at Frederikshaab and Godthaab, south of the Arctic circle, and at Disco (and Godhavn), Fiskemær, and Upernavik, north of that circle—or in Pond's Bay and Lancaster Sound, to the west of Baffin's Bay. As these are all botanically well-known localities, I shall make no further remarks on them here, observing only that Dr. Walker's plants from these quarters have been of great use to me in drawing up a general account of the whole Arctic flora, which I shall have the honour of laying before this Society; and I shall confine my attention at present to the Port Kennedy flora.

Port Kennedy is situated in latitude 72° N., and is 250 miles north of that part of the Arctic American coast which was traversed in 1839 by Dease and Simpson (who made careful collections), and about as far south of the Parry Islands, which have been thoroughly explored by General Sabine, Admiral Sir James Ross, Dr. Lyall, and many other officers. The country about Port Kennedy would at first sight appear to be favourable to Arctic vegetation in many ways. It is uncovered by snow from July 1st to October 1st; the soil is not unfavourable; and there are ravines, lakes, marshes, and sea-beach, offering both shelter and varied conditions for plants; but yet the flora seems to be considerably poorer than that of any of the surrounding islands,—Melville

* Amongst the Cryptogamic plants are two Algæ of great rarity, and three new Fungi.

Island containing no less than 67 flowering plants. Dr. Lyall's Wellington Channel herbarium contained 50, all collected north of latitude 76° N. Dr. Anderson and Herr Miertsching obtained 108 species on Bank's Land and the adjacent islands, in latitude 70°–74°; whilst Dr. Rae detected 78 species on Prince Albert, Victoria, and Wollaston lands, in latitude 66°–69°. On the west coast of Baffin's Bay, between the Arctic circle and Lancaster Sound, 80 have been collected.

Comparing Dr. Walker's herbarium with those to the north, east, and west, I find the following contrasts:—

In Melville Island the following species occur which are not found by Dr. Walker at Port Kennedy:—

Ranunculus hyperboreus, *Rottb.*, var. (Sabini, *Br.*).
—— auricomus, *L.*, var. (affinis, *Br.*).
Caltha palustris, *L.*, var. (arctica, *Br.*).
Draba lapponica, *DC.*
Parrya Arctica, *Br.*
Cardamine bellidifolia, *L.*
Stellaria longipes, *Goldie* (Edwardsii, *Br.*)
Phaca astragalina, *DC.*
Oxytropis Uralensis, *DC.*, var. (arctica, *Br.*).
Chrysosplenium alternifolium, *L.*
Sieversia Rossii, *Br.*
Taraxacum officinale, *DC.* (var. palustre).
Arnica montana.
Senecio palustris, *L.*, var. (Cineraria congesta, *Br.*)
Nardosmia corymbosa, *Hk.*
Antennaria alpina, *Br.*
Deschampsia cæspitosa, *P.B.*, var. (brevifolia, *Br.*).
Trisetum subspicatum, *P.B.*
Hierochloe alpina, *R. & S.*
—— pauciflora, *Br.*

The Port Kennedy plants not found in Melville Island are the following:—

Epilobium latifolium, *L.*
Chrysanthemum integrifolium, *Rich.*
Cassiope tetragona, *Don.*
Pedicularis capitata, *Ad.*
—— hirsuta, *Willd.*
Salix reticulata, *L.*

On the Western shores of Baffin's Bay, between Pond's Bay and Herne Bay, the following Port Kennedy plants appear to be absent:—

Stellaria humifusa, *Rottb.*
Saxifraga flagellaris, *L.*
Pedicularis sudetica, *L.*
Pedicularis capitata, *Ad.* (Western limit).
Dupontia Fischeri, *Br.*

Lastly, comparing Dr. Walker's Port Kennedy collection with Dr. Anderson's and Herr Miertsching's from the Western Polar

Islands and Bank's Land (lat. 71°–75°), I find the following in Dr. Walker's which are absent in the Western Islands :—

Stellaria humifusa, *Rottb.*
Arenaria verna, *L.*, var. (rubella, *Br.*).
Saxifraga rivularis, *L.*
Juncus biglumis, *L.*
Luzula arcuata, *Wahl.*
Pleuropogon Sabini, *Br.*
Phippsia algida, *Br.*

Of these, the *Pleuropogon* and *Phippsia* are the most peculiarly Arctic plants ; the others, except the *Stellaria*, were more probably overlooked in Bank's Land, though the collections from there appear to be so complete that this is hardly likely.

Catalogue of Dr. Walker's Collections.

I. Ranunculaceæ.

1. Ranunculus hyperboreus, *Rottb.*, and var. pygmæus, *Wahl.* Greenland (Upernavik and Disco).
2. —— nivalis, *L.* Port Kennedy, rare. Fl. July.
3. Coptis trifolia, *Salisb.* Greenland (Frederikshaab).

II. Papaveraceæ.

4. Papaver nudicaule, *L.* Greenland (Upernavik and Frederikshaab), Pond's Bay, Lancaster Sound, and Port Kennedy. Flower rosy in one specimen.

III. Cruciferæ.

5. Arabis alpina, *L.* Greenland (Disco).
6. Cochlearia officinalis, *L.*, var. Anglica and arctica. Greenland (Fiskemær and Disco), Pond's Bay.
7. Eutrema Edwardsii, *Br.* Pond's Bay and Port Kennedy.
8. Draba alpina, *L.*, and var. glacialis, *Adams.* Pond's Bay and Port Kennedy.
9. Draba rupestris, *Br.*? and var. micropetala, *Br.* Lancaster Sound and Port Kennedy.
10. Braya alpina, *Sternb.*, and var. glabella, *Rich.* Port Kennedy.

IV. Caryophylleæ.

11. Silene acaulis, *L.* Greenland (Frederikshaab, Disco, Upernavik, and Fiskemær), Port Kennedy.
12. Lychnis apetala, *L.* Pond's Bay and Port Kennedy.
13. —— alpina, *L.* Greenland (Fiskemær).
14. Cerastium alpinum, *L.* Everywhere.
15. Stellaria cerastioides, *L.* Greenland (Frederikshaab, Fiskemær and Disco).
16. —— longipes, *Goldie.* Pond's Bay.
17. —— humifusa, *Rottb.* Port Kennedy, the most common plant above high-water mark.
18. Arenaria verna, *L.*, var. rubella, *Br.* Port Kennedy.

V. Violarieæ.

19. Viola palustris, *L.*, var. blanda, *Muhl.* Greenland (Frederikshaab).

VI. Leguminosæ.

20. Astragalus alpinus, *L.* Pond's Bay.
21. Oxytropis campestris, *DC.* Pond's Bay.

VII. Rosaceæ.

22. Dryas octopetala, *L.*, var. integrifolia, *Vahl.* Greenland (Disco and Upernavik), Lancaster Sound, and Port Kennedy.
23. Potentilla tridentata, *L.* Greenland (Fiskemær).
24. —— emarginata, *Pursh*, var. nana, *Lehm.* Greenland (Upernavik).
25. —— nivea, *L.*, var. pulchella, *Br.* Greenland (Disco), Lancaster Sound, Pond's Bay, and Port Kennedy.
26. Alchemilla vulgaris, *L.* Greenland (Disco).
27. —— alpina, *L.* Greenland (Frederikshaab).

VIII. Onagrarieæ.

28. Epilobium latifolium, *L.* Greenland (Frederikshaab, Disco, and Fiskemær), Port Kennedy.

IX. Saxifrageæ.

29. Saxifraga oppositifolia, *L.* Everywhere. Flowered June 12th, at Port Kennedy.
30. —— rivularis, *L.* Everywhere.
31. —— stellaris, *L.* Greenland (Frederikshaab).
32. —— nivalis, *L.* Greenland (everywhere), Pond's Bay, and Port Kennedy.
33. —— cæspitosa, *L.* Greenland (Frederikshaab and Disco), Port Kennedy.
34. —— tricuspidata, *L.* Everywhere.
35. Saxifraga cernua, *L.* Greenland (Upernavik), Pond's Bay, and Port Kennedy.
36. —— Hirculus, *L.* Pond's Bay and Port Kennedy.
37. —— flagellaris, *L.* Port Kennedy.

X. Crassulaceæ.

38. Rhodiola rosea, *L.* Greenland (Frederikshaab).

XI. Compositæ.

39. Chrysanthemum integrifolium, *Richds.* Port Kennedy.
40. Erigeron alpinus, *L.* Greenland (Disco), Pond's Bay.
41. Arnica montana, *L.* Greenland (Disco, Fiskemær).
42. Taraxacum officinale, *DC.*, var. palustris. Greenland (Frederikshaab), Pond's Bay.

XII. Campanulaceæ.

43. Campanula rotundifolia, *L.*, var. linifolia. Greenland (Frederikshaab and Fiskemær).

XIII. Ericeæ.

44. Cassiope tetragona, *L.* Greenland (Disco and Upernavik), Lancaster Sound, and Port Kennedy.
45. —— hypnoides, *L.* Greenland (Disco).
46. Ledum palustre, *L.* Greenland (Disco).
47. Phyllodoce taxifolia, *Salisb.* Greenland (Frederikshaab).
48. Loiseleuria procumbens, *Desv.* Greenland (Frederikshaab and Fiskemær).
49. Pyrola grandiflora, *L.* Greenland (Disco and Fiskemær).
50. Diapensia Lapponica, *L.* Greenland (Disco and Upernavik).

XIV. Vaccinieæ.

51. Vaccinium uliginosum, *L.* Greenland (Upernavik and Fiskemær).

XV. Scrophularineæ.

52. Veronica alpina, *L.* Greenland (Fiskemær and Disco).
53. Pedicularis Lapponica, *L.* Greenland (Disco).
54. —— hirsuta, *L.* (lanata, *Willd.*). Greenland (Disco and Upernavik), Pond's Bay, Lancaster Sound, and Port Kennedy.
55. —— sudetica, *L.* Port Kennedy.
56. —— capitata, *Ad.* Port Kennedy.

XVI. Labiatæ.

57. Thymus serpyllum, *L.* Greenland (Frederikshaab and Fiskemær).

XVII. Plumbagineæ.

58. Armeria vulgaris, *L.* Greenland (Disco).

XVIII. Polygoneæ.

59. Oxyria reniformis, *L.* Everywhere.
60. Polygonum viviparum, *L.* Greenland (everywhere), Port Kennedy.

XIX. Empetreæ.

61. Empetrum nigrum, *L.* Greenland (everywhere).

XX. Amentaceæ.

62. Betula nana, *L.* Greenland (Frederikshaab and Disco).
63. Salix reticulata, *L.* Pond's Bay and Port Kennedy.
64. —— arctica, *Br.* Everywhere.
65. —— glauca, *L.* Greenland (Frederikshaab, Disco, and Upernavik).
66. —— herbacea, *L.* Greenland (Frederikshaab and Fiskemær).

XXI. Melanthaceæ.

67. Tofieldia palustris, *L.* Greenland (Disco).

XXII. Junceæ.

68. Juncus biglumis, *L.* Port Kennedy.
69. —— trifidus, *L.* Greenland (Fiskemær).
70. Luzula spicata, *L.* Greenland (Disco and Upernavik).
71. —— arcuata, *Wahl.* Lancaster Sound and Port Kennedy.
72. —— spadicea, *DC.* Greenland (Disco).

XXIII. Cyperaceæ.

73. Eriophorum capitatum, *L.* Greenland (Frederikshaab and Upernavik), Port Kennedy.

74. —— polystachyum, *L.* Greenland (Fiskemær and Disco), Port Kennedy.

75. Carex* fuliginosa, *St.* & *Hoppe.* Port Kennedy.

76. —— rigida, *Good.* Greenland (Upernavik).

77. —— alpina, *Sw.* (holostoma, *Drej.*). Greenland (Disco).

XXIV. Gramineæ.

78. Alopecurus alpinus, *L.* Greenland (Disco and Upernavik), Pond's Bay, and Port Kennedy.

79. Phleum alpinum, *L.* Greenland (Disco).

80. Hierochloe alpina, *R.* & *S.* Greenland (Upernavik and Disco), Pond's Bay, and Lancaster Sound.

81. Deschampsia alpina, *L.* Greenland (Frederikshaab).

82. Trisetum subspicatum, *P. B.* Greenland (Fiskemær and Disco), Pond's Bay.

83. Colpodium latifolium, *L.* Port Kennedy.

84. Dupontia Fischeri, *L.* Port Kennedy.

85. Pleuropogon Sabini, *L.* Port Kennedy.

86. Phippsia algida, *Br.* Pond's Bay.

87. Poa laxa, *Hænke.* Greenland (Disco), Pond's Bay, and Port Kennedy.

88. —— alpina. Greenland (Fiskemær, Disco, and Upernavik), Pond's Bay.

89. —— pratensis, *L.* Greenland (Disco).

90. —— nemoralis, *L.* Greenland (Disco and Fiskemær).

91. Festuca ovina, *L.* Greenland (Disco), and var. brevifolia, Pond's Bay and Port Kennedy.

92. Elymus arenarius, *L.* Greenland (Disco).

XXV. Lycopodiaceæ.

93. Lycopodium Selago, *L.* Greenland (Frederikshaab, Fiskemær, and Disco).

XXVI. Polypodiaceæ.

94. Woodsia hyperborea, *L.* Greenland (Disco), Port Kennedy.

XXVII. Equisetaceæ.

95. Equisetum sylvaticum, *L.* Greenland (Disco).

MUSCI.

(Determined by W. Mitten, Esq., A.L.S.)

Aulacomnion turgidum, *Schw.* Cape Osborne.

Bryum nutans, *Schreb.* Cape Osborne.

Pogonatum alpinum, *Brid.* Cape Osborne.

* Named by Dr. Boott.

HEPATICÆ.

Jungermannia Starkii, *Funk.* Cape Osborne.

ALGÆ.

(By Dr. Dickie, Professor of Botany, Queen's University, Belfast.)

Agarum Turneri, *Post. & Rupr.* Port Kennedy.

Laminaria saccharina, *Lamour.* Port Kennedy. Attains a length of 20 feet.

Rhodymenia interrupta, *Grev.* Port Kennedy. Dredged up. Only a single specimen of this plant was known previously; it was brought from the Arctic Regions by Lieut. Griffiths, and preserved in Mrs. Griffiths's herbarium.

Kallymenia Pennyi, *Harv.* Port Kennedy.—The specimens, though wanting the point of attachment, exhibit the general outline of *K. Dubi,* but with the margin more or less laciniate. Previously only known from fragments brought home by Dr. Sutherland.

Gymnogongrus plicatus, *Kg.* Port Kennedy.

Callithamnium Americanum, *Harv.* Port Kennedy.

Conferva melagonium, *Web. & Mohr.* Port Kennedy.

Enteromorpha compressa, *Grev.?* Port Kennedy.

Nostoc verrucosum, *Vauch.* Port Kennedy. Fresh water.

—— arcticum, *Berk.* Port Kennedy. Fresh water.

—— muscorum, *Ag.?* Port Kennedy. Fresh water.

Rivularia Pisum, *Ag.* Port Kennedy. Fresh water.

Scytonema myochrous, *Ag.* Port Kennedy. Fresh water.

Sorospora montana, *Harv.* Port Kennedy. Fresh water.

Hæmatococcus frustulosus. *Harv.* Port Kennedy. Fresh water.

Tyndaridea anomala, *Ralfs.* Port Kennedy. At the beach-line.

FUNGI.

(By the Rev. M. J. Berkeley.)

Marasmius arcticus, n. sp., *Berk.* Frederikshaab.

Agaricus furfuraceus, *P.* Godhavn and Port Kennedy.

—— vaginatus, *Bull.* Godhavn and Port Kennedy.

—— cyathiformis, *Bull.* Port Kennedy.

—— umbelliferus, *L.* Port Kennedy.

—— allosporus, *Berk.* Port Kennedy.

Hygrophorus coccineus, *Fr.* Godhavn.

Illosporium carneum, *Fr.* Port Kennedy. Very scarce.

LICHENS.

(Determined by W. Mitten, Esq., A.L.S.)

Collema furvum, *Ach.* Port Kennedy. Rare. In wet places and bed of Lake.

Sphærophoron coralloides, *Ach.* Port Kennedy. Rare. Leively.

Cladonia deformis, *Hoffm.* Port Kennedy.

—— pyxidata, *Fries.* Port Kennedy. Scarce. Leively and Cape Osborne.

—— gracilis, *Hoffm.* Greenland.

—— rangiferina, *Hoffm.* Greenland and Frederikshaab.

—— bellidiflora, *Schær.* Greenland.

Stereocaulon botryosum, *Ach.* Port Kennedy. Very common. Cape Osborne, Leively, and Greenland.

Alectoria ochroleuca, *Nyl.* Port Kennedy, Leively, and Cape Osborne.

—— jubata, *Ach.* (chalybeiformis.) Leively.

Dufourea madreporiformis, *Ach.* Port Kennedy.

—— arctica, *Hk.* Pond's Bay.

Cetraria Islandica, *Ach.* Leively.

Solorina crocea, *Ach.* Leively.

—— saccata, *Ach.* Port Kennedy. Very scarce.

Platysma nivalis, *Nyl.* Port Kennedy and Frederikshaab.

—— juniperinum, *Nyl.* Port Kennedy.

Parmelia saxatilis, *Ach.* Port Kennedy and Leively.

—— incurva, *Fries.* Port Kennedy and Leively.

—— conspersa, *Ach.* Port Kennedy.

—— stygia, *Ach.* Port Kennedy.

—— lanata, *Nyl.* Leively.

Physcia pulverulenta, *Fries.* Port Kennedy.

—— candelaria, *Nyl.* Cape Osborne.

Umbilicaria hyperborea, *Hoffm.* Port Kennedy. Not common.

—— hirsuta, *DC.* Port Kennedy. Rather rare. Leively.

—— proboscidea, *DC.* Port Kennedy. Most common of *Umbilicariæ.*

—— cylindrica, *Ach.* Leively.

Squamaria gelida, *Nyl.* Port Kennedy. Rare.

Placodium murorum, *DC.* Port Kennedy.

—— elegans, *DC.* Port Kennedy. Abundant. Cape Osborne.

Lecanora tartarea, *Ach.* Port Kennedy. Abundant. Leively and Cape Osborne.

—— subfusca, *Ach.* Port Kennedy.

—— chlorophana, *Ach.* Port Kennedy.

—— frustulosa, *Ach.* Port Kennedy. Scarce.

—— cerina, *Ach.* Port Kennedy. Scarce.

—— ventosa, *Ach.* Port Kennedy, Leively, and Cape Osborne.

—— vitellina, *Ach.* Port Kennedy. Scarce.

Lecidea vesicularis, *Ach.* Port Kennedy. Scarce.

Lecidea lapicida, *Fries*. Port Kennedy.
—— rupestris, *Ach*. Port Kennedy.
—— globifera, *Ach*. Port Kennedy.
—— petræa, *Ach*. Port Kennedy.
—— geographica, *Ach*. Port Kennedy and Cape Osborne.
—— alpicola, *Wahl*. Port Kennedy. Universal.
Urceolaria scruposa, *Ach*. Port Kennedy.

I append a *résumé* of the important observations made by Dr. Walker on the temperature of the air and earth, and the average covering of snow; and, to render them more complete, I have extracted and meaned the monthly temperatures of Boothia of from three to four years' observations, published in Sir John Ross's 'Voyage.' The observations of these officers correspond to a remarkable degree, the approximate mean annual temperature, according to Ross, being $+2°\cdot5$, and by Walker (interpolating August as 28°) $+1°\cdot0$. The high mean temperature of the soil at 2 feet 2 inches depth is very remarkable, and that of the surface of the earth below the snow, which depends much on the temperature of the subsoil, and is of great influence upon the vegetation, is still more remarkable.

Observations at Port Kennedy on the Temperature of the Soil, &c.
By Dr. Walker.

On the 14th September, 1858, so soon as it appeared probable that we should winter at Port Kennedy, I sunk a brass tube 2 *feet* 2 *inches* vertically in the ground, and inserted a padded thermometer. The ground at the time of sinking the tube was *frozen from* 6 *inches* below the surface, and it was with great difficulty that I could get the tube sufficiently far down. The soil (surface) was similar to that strewn over the land, but from below 6 inches it was of a yellowish mud. The thermometer used was one of very small bore, with a long stem finely graduated (it had been prepared for taking the temperature of trees).

From the 18th to 29th September, no register was made, as the ship was not in port; also from the 10th to the 28th March, 1859, as I was absent from the ship, travelling. The minimum temperature registered was $+0\cdot5$, on March 10th, 1859; the lowest may be assumed *at zero, on the* 16*th March*. The register was continued until June 18, when water entered the tube and the thermometer was frozen to the side, so that it could not be detached.

Column 2 gives the register of the thermometer. Column 3 gives the depth of the overlying snow, which was always

greater than the average quantity over the land. On the 17th January, 1859, a tube was placed 1 foot 1 inch deep in a mixture of shingle and earth; in this a thermometer was placed. The position of the ground was such that scarcely any snow lay upon it, the constant strong winds removing it almost as soon as deposited. Column 4 gives the register of this thermometer. February 12th, 1859, a tube was placed horizontally on the surface of the ground beneath the snow lying over the place where thermometer No. 1 was sunk, and the temperature as shown by this thermometer (Column 5) was registered until all the snow disappeared. Column 6 gives the mean temperature of the air for the day on which the registers of the different thermometers were taken. Column 7 gives the mean temperature of the air for the number of days or hours intervening between the registering of the thermometers.

All the registers of the different thermometers are corrected so as to reduce them to that of the standard.

Date.	Thermometer buried 2 ft. 2 in.	Depth of snow.	Thermometer buried 1 ft. 1 in.	Temp. of surface below snow.	Mean of air on days of observation.	Mean of air from that of intervals.	Ross.
1858.		ft. in.					
Sept. ...	+30·9	......	......	......	+25·0	+24·5	+25
Oct. ...	+24·4	0 6	......	......	+ 9·6	+ 8·4	+ 9
Nov. ...	+15·8	4 0	......	......	−12·0	−13·6	− 9
Dec. ...	+12·0	4 5	......	......	−34·9	−33·7	−16
1859.							
Jan.......	+ 6·2	5 8	−21·5	......	−34·0	−33·4	−26
Feb. ...	+ 2·3	5 8	−24·8	− 3	−32·7	−34·8	−32
March...	+ 0·7	6 0	−16·7	− 3·8	−19·9	−17·4	−27
April ...	+ 1·6	6 6	− 8·1	+ 0·7	− 1·6	− 5·4	− 3
May ...	+ 3·5	6 0	+ 8·1	+ 4·9	+16·4	+14·4	+14
June ...	+ 7·5	3 6	+27·3	+26·0	+34·2	+35·0	+34
July ...	+31·7	0 0	+39·0	......	+40·7	+39·9	+36
Aug. ...	? +40·0	?0 0	?	......	? +30	+28·0	+25
Mean...	+14·7	......	......	......	+ 1·8	+ 1·0	+ 2·5

Hepaticæ Indiæ Orientalis: an Enumeration of the *Hepaticæ* of the East Indies. By William Mitten, Esq., A.L.S.

The following enumeration comprises all the species collected by Dr. J. D. Hooker in the Himalaya, and in conjunction with Dr. Thomson in the Khasia Mountains, as well as those gathered in Ceylon by the late Dr. Gardner and Mr. Thwaites, and includes the species noticed by Griffith, together with those described in

the 'Synopsis Hepaticarum' by Gottsche Lindenberg and Nees von Esenbeck.

The arrangement is nearly that of the 'Synopsis;' but certain genera have been removed from the group with succubous, to that with incubous leaves. *Alicularia* and *Gymnomitrium* are included in *Jungermannia*, and *Phragmicoma* and *Thysananthus* are united to *Lejeunia*; *Jungermannia setacea* is now first removed to *Lepidozia*, and *J. trichophylla* to *Ptilidium*. *Sendtnera Woodsii* is remarkable for its recurrence in the Eastern Himalaya. Compared with the Musci, the Indian Hepaticæ are few in number; but very little is yet known of the species which must inhabit the peninsula, and particularly the Nilgiri Mountains, where the transition from the North Indian species to those of Ceylon and the Indian Archipelago would be likely to offer some interesting forms.

HEPATICÆ.

§ I. Foliosæ.

* Folia succuba.

1. Jungermanniaceæ.

Obs. Species asterisco* notatæ easdem auctori non visas denotant.

1. Jungermannia, *Linn.*

1. J. atrata, sp. n. Caule erecto, subsimplici, apice sæpe incurvo; foliis subsecundis, imbricatis, ovato-subquadratis sinu acuto bidentatis, atratis, marginibus ubique reflexis; perianthio nullo; foliis involucralibus caulinis conformibus.

Hab. In Himalayæ orientalis regione temperata et alpina, alt. 9–15,000 ped., Nepal orient. et Sikkim, *J. D. H.* (No. 1300, 1301, 1306, 1302, 1303, 1307, 1305, 1309, 1330, 1336).

J. auritæ similis, sed marginibus foliorum integerrimis anguste reflexis.

2. J. concinnata, *Lightf.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 11,000 ped., *J. D. H.* (No. 1335).

3. J. rubida, sp. n. Caule erecto, subsimplici, apice incurvo; foliis imbricatis, subsecundis, ovatis, concavis, rubro-fuscis, nitidis, apice oblique sinu parvo obtuso emarginatis; involucralibus caviusculis, cæteroquin caulinis similibus; perianthio nullo.

Hab. In Himalayæ reg. temp. Kumaon, *Strachey et Winterbottom*! Sikkim, alt. 12,000 ped., *J. D. H.* (No. 1300 *b*).

4. J. Haskarliana, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp. et subtrop., Sikkim, alt. 4–7000 ped., *J. D. H.* (No. 1322, 1323, 1324).

5. J. APPRESSIFOLIA, sp. n. Caule erecto; foliis orbiculatis, antice paululum decurrentibus, marginibus incurvis, imbricato-appressis; perianthio exserto, oblongo, inferne lævi, superne quinqueplicato, acutiusculo.
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7000 ped., *J. D. H.* (No. 1326).
J. Haskarlianæ similis, sed foliis antice subdecurrentibus firmioribusque.

6. J. LANIGERA, sp. n. Caule erecto; foliis patentibus, semiverticalibus, orbiculatis, antice longe decurrentibus, concavis, subtus appresse araneo-lanuginosis, margine erecto siccitate revoluto; perianthio longiuscule oblongo, apice quinqueplicato, superficie tota araneo-lanuginoso.
Hab. In Himalayæ orient. reg. temp. et alp., Sikkim, alt. 7–14,000 ped., *J. D. H.* (No. 1318, 1320, 1588).
Habitu *J. Haskarlianæ,* sed paululum robustior et tela araneosa distincta.

7. J. MARCESCENS, sp. n. Caule erecto; foliis patentibus, verticalibus, medio excavatis, orbiculatis, margine undulatis; perianthio libero, oblongo, obtuso, apice quinqueplicato; foliis involucralibus majoribus ad dimidium perianthii attingentibus.
Hab. In Himalayæ orient. reg. temp., Nipal, alt. 11,000 ped., *J. D. H.* (No. 1316).
J. Haskarliana robustior, pallide fusca, inferne marcescens dealbata.

8. J. lanceolata, *Linn.*
Hab. In Himalayæ occident. reg. temp., Simla, alt. 7–10,000 ped., *T. T.* (No. 1578).

9. J. PURPURATA, sp. n. Caule cæspitoso, erecto, parce ramoso; foliis semiverticalibus, erecto-patentibus, appressis, orbiculatis, marginibus incurvis basi decurrentibus; involucralibus conformibus, liberis; perianthio oblongo, obtuso, superne quadri- quinqueplicato.
Hab. In montibus Khasianis Bengaliæ orient. reg. trop., alt. 2–4000 ped., *Griffith*! *J. D. H. et T. T.* (No. 1327).

10. J. sanguinolenta, *Griff. Notulæ,* p. 302; *Icon.* pl. 70. f. 3.
Hab. In reg. temp. et trop. Assam, et mont. Khasian., alt. 5–6000 ped., *Griffith*!
J. purpurata major, cellulis duplo majoribus, et perianthio a foliis involucralibus uno latere non discreto, diversa.

11. J. ASSAMICA, sp. n. Caule procumbente, gracili, radiculoso; foliis orbiculatis, semiverticalibus, sæpe subcomplicatis, saccatis, grosse areolatis; amphigastriis ovatis caulis latitudinem æquantibus; perianthio ovato, acuminato fere ad medium foliis involucralibus coadunato.
Hab. In montibus Khasian. reg. subtrop., alt. 4–6000 ped., *Griffith*!
J. scalari et *J. obovatæ* affinis, sed foliis grosse areolatis, et magnitudine *J. bicuspidatam* vix superante.
Jungermannia, sp. (Griff. Notulæ, p. 302; Icon. Plant. Asiat. pl. 70. f. 2) cum speciminibus non omnino quadrat.

12. J. polyrhiza, *Hook.*, *Griff. Icon. Asiat.* pl. 70. f. 1 ?

Hab. In Himalayæ reg. temp., Kumaon, alt. 6–7000 ped., *T. T.* (1580); Nepal, *Wallich*! Sikkim, 5–8000 ped., *J. D. H.* (No. 1325, 1576, 1581); Assam, *Griffith*! necnon in insula Ceylon, ad Peradenia, *Gardner*!

13. J. Ariadne, *Taylor.*

Hab. In insula Pulo Penang, *Wallich*! Pegu, *M'Clelland*! In Himalayæ prov. Sikkim, alt. 5–6000 ped., *J. D. H.* (No. 1579). Kumaon, alt. 8500 ped., *Strachey et Winterbottom*!

14. J. elongella, *Taylor.*

Hab. In mont. Khasian. reg. subtrop., alt. 4–5000 ped., *J. D. H. et T. T.* (No. 1577). In Nipal, *Wallich*!

A *J. Tasmanica,* Taylor, discrimen nullum nisi staturam graciliorem inveni.

15. J. flexicaulis, *Nees ab E.*

Hab. In insula Ceylon ad Newera Ellia, *Gardner*! (No. 1349).

16. J. PLURIDENTATA, sp. n. Caule procumbente, simplici; foliis divergentibus, semiverticalibus, flabelliformibus, circiter quinquelobatis, lobis spinoso-dentatis flexuosis; amphigastriis conformibus, dimidio minoribus.

Hab. In Himalayæ orientalis reg. temp., Sikkim, alt. 10–12,000 ped., *J. D. H.* (No. 1299).

J. barbatæ var. *lycopodioidi* non dissimilis, sed folia profundius fissa dentibus magis fimbriata texturaque teneriora.

17. J. SETOSA, sp. n. Caule decumbente; foliis semiverticalibus, flabelliformibus, quadri- quinquelobatis, sinuatis, undulatis, cellulis majoribus fuscidulis marginatis, denticulis setiformibus pallidis ciliatis; amphigastriis nullis; perianthio oblongo, cylindraceo, ore dentato; foliis involucralibus caulinis conformibus.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 12,000 ped., *J. D. H.* (No. 1317).

Habitu magnitudineque *J. Bautriensis* formis majoribus non absimilis, coloreque subnigro obscuro conveniens, marginatione autem foliorum denticulisque setiformibus a congeneribus facillime distinguenda.

18. J. piligera, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp., alt. 11,000 ped., *J.D.H.*; necnon in insula Ceylon, *Thwaites*!

19. J. imbricata, *Wils.*

Hab. In insula Ceylon, *Wight*? *Gardner*!

Forsan præcedentis forma adultior?

20. J. Doniana, *Hook.*

Hab. In Himalayæ orient. reg. alp., Sikkim, alt. 13,000 ped., *J. D. H.* (No. 1310).

21. J. exsecta, *Schm.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 12,000 ped., *J. D. H.* (No. 1308).

22. J. ASSIMILIS, sp. n. Caule erecto; foliis patentibus, semiverticalibus, ovatis, apice emarginato-bidentatis, margine antice decurrente; perianthio cylindrico obtuso, ore dentato; foliis involucralibus caulinis conformibus.

Hab. In Himalayæ orient. reg. temp. et alp., Sikkim, alt. 10–14,000 ped., *J. D. H.* (No. 1321); Lachen, alt. 10–11,000 ped. (No. 1321); Kankola, alt. 14,000 ped., inter *Cladoniam uncialem*, Sikkim, Himalayæ alp., *J. D. H.*

J. involutifoliæ proxima, et, nisi defectu denticuli a foliorum margine ventrali, vix distingui potest.

23. J. setigera, *Ldbg.*

Hab. In mont. Khasian. reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.*

24. J. hirtella, *Weber, Griff. Icon.* pl. 71. f. 1, 2.

Hab. In Himalayæ centralis et orientalis reg. subtrop., temp. et alp., Nepal, *Wallich*! Sikkim, alt. 8–14,000 ped., *J. D. H.* (No. 1311, 1329, 1337, 1314, 1313, 1312). Assam, et montibus Khasiæ, alt. 4–6000 ped., *Griffith*! *J. D. H. et T. T.* (No. 1574, 1327, 1328).

25. J. setiformis, *Ehr.*

Hab. In Himalayæ orient. reg. temp. et alp., Nepal et Sikkim, alt. 10–13,000 ped., *J. D. H.* (No. 1298, 1315).

26. J. Orcadensis, *Hook.*

Hab. In Himalayæ orientalis reg. temp. et alp., Sikkim, alt. 10–13,000 ped., *J. D. H.* (No. 1331, 1332, 1333, 1334).

Per regionem alpinam inter muscos vulgaris, semper absque fructu.

27. J. ventricosa, *Dicks.*

Hab. In Himalayæ orientalis reg. temp., Sikkim, 12,000 ped., *J. D. H.*

28. J. bicuspidata, *Linn.*

Hab. In montium Khasian. regione subtropica, alt. 4000 ped., fragmenta, *J. D. H. et T. T.*

29. J. connivens, *Dicks.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 10,000 ped., *J. D. H.*; et Khasia, alt. 4000 ped., subtrop., *J. D. H. et T. T.* (No. 1586).

30. J. ALBULA, sp. n. Caule assurgente, albido, pellucido; foliis patentibus, semiverticalibus, ovatis, bicuspidatis; perianthio in ramis terminali, elongato, inflato-tubuloso, superne obtuse trigono, ore dentato; foliis perichætialibus bi- tricuspidatis.

Hab. In montibus Khasianis, reg. subtrop., alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1339 *b*).

J. bicuspidatæ maxime affinis, sed triplo major, siccitate vix mutata.

31. J. divaricata, *Eng. Bot.*

Hab. In Himalayæ orientalis reg. subtrop. et temp., alt. 11,000 ped., *J. D. H.* (1307 *b*); et mont. Khasiæ, alt. 4000 ped., *J. D. H. et T. T.*

2. Plagiochila, *Nees et Mont.*

1. *Vagæ.*

a. patulæ.

32. P. Nepalensis, *Ldbg.*, *Griff.*, *Icon.* t. 74. f. 2?

Hab. In Himalayæ occident. reg. temp., Kumaon, 8,500 ped., *Strachey et Winterbottom.* Assam, *Griffith*! Montibus Khasian. reg. subtrop. et temp., alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1352, 1352 *c*, 1374, 1629).

33. P. fruticosa, sp. n. Caule repente, ramis gracilibus, erectis, dendroideis, inordinate pinnatis, fruticosis, rigidulis; foliis patentibus, subovatis, margine dorsali recurvo basi decurrente apicem versus paucidentato integerrimove, ventrali apiceque oblique spinuloso-dentatis rigidis, siccitate vix mutatis; involucralibus magis dentatis; perianthio campanulato, compresso, ore labiis rotundatis spinuloso-dentatis.

Hab. In Himalayæ orient. reg. temp., alt. 7–10,000 ped., *J. D. H.* (No. 1353, 1354); et montibus Khasiæ, alt. 5000 ped., *J. D. H. et T. T.* (No. 1627); necnon in Assam, *Griffith*!

A *P. frondescente,* quoad plantam Javanicam, statura graciliore et foliis ambitu diverso apice oblique subbidentatis dente ventrali validiore refugit.

b. distichæ.

34. P. flexuosa sp. n. Caule decumbente, subpendulo, longo, flexuoso, parce ramoso; foliis divergentibus, elongato-ovalibus, apice oblique truncatis, parce dentatis, sæpe mucrone apicali excepto integerrimis; involucralibus latioribus, marginibus ventralibus ciliato-dentatis; perianthio brevi, late obovato truncato compresso, ore ciliato dentato.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 8000 ped., *J. D. H.* (No. 1367).

Caulis quadripollicaris simpliciusculus; folia remota parce dentata explanata.

35. P. orientalis, *Taylor.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7000 ped. (No. 1350). Mont. Khasiæ, 5000 ped., *J. D. H. et T. T.*; et in Assam, *Griffith*! (No. 1619).

36*. P. Liebmanniana, *Ldbg.*

Hab. In India orientali, *Hb. Ldbg. L. et N.*

37. P. tenuis, *Ldbg.*

Hab. In Himalaya centrali, Nepal, *Wallich*!

38*. P. dichotoma, *Nees ab E.*
Hab. In montibus Nilgiriensibus, *Perrottet.*

39. P. DENTICULATA, sp. n. Caule procumbente, gracili, subsimplici; foliis patenti-divergentibus, oblique ovatis, obtusis, marginibus toto ambitu denticulis approximatis spinoso-ciliatis.
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7-8000 ped., *J. D. H.* (No. 1356 *b*).
Subuncialis, latitudine vix linearis. Folia exsiccatione parum mutata.

40*. P. securifolia, *Nees ab E.*
Hab. In insula Ceylon, *Wight.*

2. *Adiantoideæ.*

a. planifoliæ.

41. P. sciophila, *Nees ab E.*
Hab. In Himalayæ orient. regionibus subtropicis et temperatis, Sikkim, *J. D. H.* (No. 1363, 1623); et mont. Khasiæ, alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1613).

b. cristatæ.

42. P. KHASIANA, sp. n. Caule erecto, dichotome ramoso; foliis patentibus, anguste ovatis, margine dorsali recurvo basi integerrimo, superne apice margineque ventrali breviter denticulatis; perianthio obovato compresso, labiis rotundatis denticulatis.
Hab. In mont. Khasian. reg. subtrop., alt. 3-4000 ped., *J. D. H. et T. T.* Insula Ceylon, *Gardner*!
P. Nepalensi similis, sed folia longiora angustiora læviusque dentata.

43. P. Wightii, *Ldbg.*
Hab. In Himalayæ orient. reg. subtrop. et temp., Sikkim, alt. 3–10,000 ped., *J. D. H.* (No. 1616, 1617, 1275). Montibus Khasiæ, alt. 3–5000 ped., *J. D. H. et T. T.* (No. 13,756, 13,526). Insula Ceylon, *Gardner*!

44*. P. Mauritiana, *Nees ab E.*
Hab. In India orientali, *Hb. Vahl et Colsmann.*

45*. P. parvifolia, *Ldbg.*
Hab. In Pegu, *Belanger.*

c. dendroideæ.

46. P. FIRMA, sp. n. Caule decumbente, breviusculo, dichotome ramoso, gracili, radiculoso; foliis patentibus, remotis, ovalibus, margine dorsali integerrimo recurvo apice bi- tridentato, ventrali denticulato integerrimove; involucralibus conformibus; perianthio deflexo, brevi, obovato compresso, labiis obtusis dentatis.
Hab. In Himalayæ orient. regione temperata, in pinetis, Sikkim, alt. 10,000 ped., *J. D. H.* (No. 1364).
*J. planatæ P. Dicksoni*que comparanda, sed partibus omnibus gracilior

perianthioque diversa. Adest species Javanica huic quam maxime similis, quam, sub nomine *P. simplicis, β*, a cl. Van den Bosch accepi =*P. spathulæfolia*, sp. n. Caule procumbente, dichotomo, parce ramoso; foliis sparsis, patentibus, siccitate revolutis, margine pectinato, late spathulatis, marginibus recurvis, apice obtusiusculo bi- tridenticulatis; involucralibus conformibus; perianthio infundibuliformi, compresso, labiis rotundatis dentatis. Foliis ambitu spathulatis, apice sinubus minime profundis denticulatis, et cellulis majoribus recedens; a *P. simplici* forma foliorum et perianthii certe distans.

3. *Asplenioideæ.*

a. foliis integerrimis.

47. P. trapezoidea, *Ldbg.*
Hab. In Himalayæ orientalis regione temperata, Sikkim, 6–10,000 ped., *J. D. H.* (No, 1620, 1630).

48. P. RETUSA, sp. n. Caule debili, vage ramoso, brevi; foliis patentibus, remotis, subquadratis, apice retusis, integerrimis.
Hab. In Himalayæ orientalis reg. temp., Sikkim, alt. 12,000 ped., *J. D. H.* (No. 1365).
Formas nonnullas minores *P. spinulosæ* referens, sed folia retusa integerrima. Forsan mera forma juvenilis speciei cujusdam alterius; transitionis tamen vestigium nullum.

49. P. AMBIGUA, sp. n. Caule erecto; foliis patentibus, deltoideo-ovatis obtusis, margine ventrali apiceque denticulatis, dorsali recurvo integerrimo; involucralibus conformibus; perianthio longiusculo-obovato compresso, labiis obtusis ciliato-dentatis.
Hab. In Himalayæ occidentalis reg. temp., Simla, alt. 8–10,000 ped., *T. T.* (No. 1376, 1376 *b*).
P. asplenioidi affinis, diversa tamen foliorum forma magis deltoidea et perianthio.

50. P. INTEGRIFOLIA, sp. n. Caule procumbente, intertexto, ventre radiculoso; foliis patentibus, approximatis, deltoideo-ovatis, integerrimis, apice rotundatis retusisve, margine dorsali recurvo.
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 5–6000 ped., *J. D. H.* (No. 1351).
P. radiculosæ et *P. approximatæ* affinis, minor tamen et foliis latioribus flaccidis.

4. *Heteromallæ.*

a. conjugatæ.

51. P. Brauniana, *Nees ab E.*
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7–10,000 ped., *J. D. H.* (No. 1355, 1356, 1358); et in insula Ceylon, *Gardner*!

52. P. opposita, *Nees ab E.* (P. Zygophylla, *Taylor.*)
Hab. In insula Ceylon, *Gardner*! (No. 1359).

53. P. FIMBRIATA, sp. n. Caule erecto; foliis patentibus, subrotundis flabelliformibusve, oppositis, coalitis, extus grosse spinoso-dentatis; perianthio infundibuliformi, ore fimbriato-dentato; foliis involucralibus dentibus validis denticulatis.

Hab. In mont. Khasian. reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.*

Habitu *P. oppositæ*, sed foliis basi angustatis flabelliformibusque, dentibus etiam validioribus.

b. bifariæ.

54. P. DEBILIS, sp. n. Caule erecto, gracili; foliis patentibus, subsecundis, remotis, ambitu subquadratis bifidis, margine dorsali integerrimis, ventrali sparse dentato integerrimove; perianthio compresso, late infundibuliformi, dentato, dorso anguste alato; foliis involucralibus amplius dentatis.

Hab. In Himalayæ orientalis reg. temp., alt. 7–10,000 ped., *J. D. H.* (No. 1360, 1368, 1370). Tonglo, alt. 10,000 ped. (No. 1368). Sikkim, alt. 7,000 ped. (No. 1370). Sikkim Himalayæ temp., Singalelah, alt. 11,000 ped. (No. 1360). Sikkim Himalayæ alp., *J. D. H.*

P. centrifugæ, Taylor, et *P. biseriali* similis, sed gracilior, foliis remotioribus minusque orbiculatis.

c. secundæ.

55. P. DEFLEXA, sp. n. Caule breviusculo, dichotomo, parce ramoso, ventre radiculoso; foliis patentibus, sæpe deflexis, secundis, ovato-oblongis, margine dorsali recurvo, ventrali parce dentato, apice dentibus paululum majoribus sub-bidentatis; involucralibus conformibus; perianthio longe obovato, compresso, subtruncato, ore breviter denticulato.

Hab. In Himalayæ orientalis reg. temp., Sikkim, alt. 7–12,000 ped., *J. D. H.* (No. 1615, 1621, 1361, 1361*b*, 1372).

P. sciophilæ similis, sed textura foliorum firmiore et caulis ventre linea radicellarum vestito.

56. P. MICRODONTA, sp. n. Caule erecto, dichotome parce ramoso, gracili; foliis patentibus, deltoideo-rotundatis lateve ovatis, apice breviter parceque denticulatis, cæteroquin integerrimis; involucralibus conformibus, magis dentatis; perianthio obovato-truncato, ore breviter dentato-ciliato.

Hab. In peninsula Malayana ad Moulmein, *Parish*! et insula Ceylon, *Gardner*!

P. deltoideæ affinis, sed minor, foliis apice breviter parceque dentatis.

57. P. ELEGANS, sp. n. Caule erecto, subsimplici; foliis patentibus, ovatis, apice subtruncatis, margine dorsali integerrimo recurvo, ventrali apiceque breviter denticulis dimorphis ciliatis.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 8000 ped., *J. D. H.* (No. 1366).

P. macrostachyæ simillima, foliis tamen apice subobliquе truncatis, ut margo dorsalis in angulum evadit, habitusque minus strictus.

58. P. Ceylanica, sp. n. Caule erecto, vage dichotome ramoso: foliis divergentibus, semicordato-ovatis, margine dorsali integerrimo recurvo, ventrali apiceque parce denticulato; involucralibus conformibus; perianthio obconico, decurvo, compresso, labiis rotundatis dentato-ciliatis.

Hab. In insula Ceylon ad Rambodde, *Gardner*! *Thwaites*!

Statura et foliis *P. fuscæ*, Van der Sande-Lacoste (Synops. Hepat. Javan. t. 5), non dissimilis, sed folia remotiora, cellulis minoribus, dentibusque minus validis. Perianthium eo *P. rutilantis* simile.

59. P. uniformis, sp. n. Caule erecto, apice decurvo, parce dichotome ramoso; foliis patentibus, ovatis, obtusis, margine dorsali integerrimo recurvo, ventrali apiceque ciliato-denticulatis; involucralibus conformibus; perianthio lineari, compresso, labiis subtruncatis ciliato-dentatis.

Hab. In mont. Khasian. reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1618, 1624).

P. Teysmanni, Van der Sande-Lacoste, quoad staturam conveniens, sed ambitu foliorum uniformi *P. Neesiano* et *P. Hookeriano* similior.

60*. P. subintegerrima, *Nees ab E.*

Hab. In Himalaya centrali, prov. Nepal, ad Gossain, Than, et Kumaon, *Hb. Lehmann.*

61. P. æqualis, sp. n. Caule erecto, subsimplici; foliis approximatis, patentibus, ovatis obtusis, margine dorsali reflexo, ventralique breviter denticulato; involucralibus conformibus; perianthio lineari-elongato compresso, bilabiato, labiis rotundatis denticulatis.

Hab. In insula Ceylon, ad Horton Plains, *Gardner* (1614).

Caulis tri- quadripollicaris, foliis æqualibus. *P. Hookerianæ* affinis, sed vix ramosa.

62. P. secretifolia, sp. n. Caule erecto, parce dichotome ramoso, ventre dense radiculoso; foliis remotis, patentibus, oblongo-ovatis, margine dorsali integerrimo recurvo, ventrali e medio ad apicem apiceque ipso parce dentato-ciliatis; involucralibus conformibus; perianthio lineari compresso, labiis rotundatis breviter dentato-ciliatis.

Hab. In Himalayæ orient. reg. temp., Sikkim, 8000 ped., *J. D. H.* (No. 1371).

Quoad staturam, *P. semidecurrenti* similis, perianthio autem *P. trapezoideæ*.

63. P. renitens, *Ldbg.*

Hab. In mont. Khasian. reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1357 *b*).

64. P. variegata, *Ldbg.*

Hab. In insula Ceylon, *Gardner*! (No. 1628).

d. crispulæ.

65. P. semidecurrens, *L. et L.*

Hab. In Himalayæ regione temperata, Kumaon, 8500 ped,. *Strachey et*

Winterbottom ! Sikkim, alt. 8–12,000 ped., *J. D. H.* (No. 1373, 1362, 1625, 1369). Mont. Khasiæ regione subtrop., alt. 5000 ped., *J. D. H. et T. T.* (No. 1626).

66*. P. phalangea, *Taylor.*
Hab. In Himalaya centrali, Nipal, *Wallich.*
An *P. Wightii?*

3. Leioscyphus, *Mitten in Fl. Nov. Zelandiæ.*

67. L. Taylori. (Jungermannia, *Hook.*)
Hab. In Himalayæ orient. reg. temp., Sikkim, in pinetis, alt. 11,000 ped., *J. D. H.* (No. 1340).

4. Lophocolea, *Nees ab E.*

68. L. bidentata, *Nees ab E.*
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7000 ped., *J. D. H.* (No. 1343).

69. L. flaccida, sp. n. Caule procumbente, subsimplici; foliis divergentibus, subtriangularibus, devexis, apice breviter bi- tridentatis, involutis, margine dorsali recto undulato cum folio opposito decurrente connato, ventrali convexo cum amphigastrio ovato-orbiculato concavo apice truncato bidentato marginibus parce breviter dentatis utrinque coalito, textura tenera flaccida fragillima, e cellulis parvis intercalaribus distinctis areolata.
Hab. In regione temperata Himalayæ orientalis, Sikkim, alt. 7–11,000 ped., *J. D. H.* (No. 1344, 1345).

70. L. muricata, *Nees ab E.*
Hab. In montibus Nilgiriensibus (inter *Campylopodes Perrottetii*), *Perrottet* !

71. L. ciliolata. (Plagiochila *Ldbg.*)
Hab. In insula Ceylon, *Gardner* ! *Thwaites* !

72. L. heterophylla, *Hook.*
Hab. In Himalayæ boreali-occident. reg. temp., Simla, alt. 7000 ped., *T. T.*

73*. L. discedens, *L. et Ldbg.*
Hab. In India orientali, *Vahl.*

5. Chiloscyphus, *Corda.*

74. C. argutus, *Nees ab E.*
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 5–7000 ped., *J. D. H.* !

(No. 1347); et mont. Khasiæ, alt. 5–6000 ped., *J. D. H. et T. T.* (No. 1346). Assam, *Griffith*!

75. C. coalitus, *Nees ab E.*

Hab. In mont. Khasian. reg. subtrop. et temp., alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1240, 1241, 1242).

76. C. perfoliatus, *Nees ab E.*

Hab. In montibus Nilgiriensibus, *Perrottet*! In insula Ceylon, *Gardner*!

77*. C. decurrens, *Nees ab E.*

Hab. In peninsula Malayana ad Singapore, *Gaudichaud.*

6. Sphagnœcetis, *Nees ab E.*

78. S. communis, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp. et subalp., alt. 10–12,000 ped. *J. D. H.* (No. 1609).

II. Geocalyceæ.

1. Gymnanthe, *Taylor.*

79. G. ciliata, sp. n. Caule gracili, inter muscos vagante; foliis patentibus, ambitu subquadratis, sinu rectangulo inæqualiter bidentatis, dente dorsali majore, marginibus ubique ciliis capillariformibus longissimis ciliatis.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 11,000 ped., inter muscos, *J. D. H.*

Habitu et magnitudine *G. lophocoleoidis*, ciliis autem longissimis a confinibus statim dignoscenda.

80. G. lutescens. (Gymnomitrium lutescens, *Gottsche.*)

Hab. In India orientali, *Wallich*! Insula Ceylon, *Gardner*! etiam in Java! *Motley.*

** Folia incuba.

I. Gottscheaceæ. *Folia biloba complicata.*

1. Isotachis, *Mitten.*

81. I. Indica, sp. n. Caule erecto, parce ramoso; foliis amphigastriisque subæqualibus, patentibus, cordatis, complicatis, apice bi- tridentatis, marginibus remote spinoso-dentatis, basi decurrentibus denticulatis.

Hab. In montium Khasian. reg. trop., alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1339).

I. serrulatæ affinis et simillima, foliis tamen minus spinoso-dentatis, apice ut plurimum tridentatis, textura paululum crassiore, cellulis angustioribus diversa. *Color* plantularum pallida. *I. armata* triplo major, foliorum apicibus non incurvis.

Probable 1339 c

2. Scapania, *Ldbg.*

82. S. contorta, sp. n. Caule erecto, simplici; foliis patenti-divergentibus, basi cordatis, apice bilobatis, lobo ventrali oblongo obtuso, dorsali subtruncato acuto, margine ventrali apicibusque loborum denticulatis; involucralibus conformibus; perianthio subcylindrico, ore contracto denticulato.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 6000 ped., *J. D. H.*

Statura *S. albicantis,* sed foliorum lobo ventrali elongato et appressione lobi dorsalis paululum contorto. *Color* subniger. *Perianthium S. albicantis* et *S. obtusifoliæ*, ejusdem formæ quæ in *S. Nepalensi* obvia est. Hi omnes ad *Scapaniam* reducimus, quanquam perianthii forma a *S. nemorosa* recedit, nam in *S. undulata* interdum perianthia vel apice bilabiato vel tubulosa ore contracto inveniuntur, præter foliorum insertionem incubam, ut supra memoratum.

83. S. planifolia, *Nees ab E.* (S. Nepalensis, *Nees ab E.*)

Hab. Inter muscos Himalayæ boreali-occident., *Royle.* In Himalayæ orient. reg. temp., Sikkim, alt. 10–12,000 ped., *J. D. H.* (No. 1445, 1446). In Assam superiore, *Griffith*!

84. S. ferruginea, *L. et Ldbg.*

Hab. In Himalayæ orientalis reg. temp., Sikkim, alt. 7–11,000 ped., *J. D. H.* (No. 1443, 1444, 1445, 1448, 1610, 1611).

85. S. lepida, sp. n. Caule erecto; foliis patentibus divergentibusque, lobo ventrali obovato obtuso, dorsali quadrato-orbiculato, ad dimidium ventralis attingente eique adpresso, marginibus loborum ubique pulchre, sæpe fusco marginatis denticulisque ciliatis.

Hab. In insula Ceylon, *Thwaites*!

Formis majoribus *S. nemorosæ* similis, at margine foliorum cartilagineo species ab omnibus congeneribus distincta, pulcherrima.

3. Gottschea, *Nees ab E.*

86. G. aligera, *Nees ab E.*

Hab. In mont. Nilgiri, *Gardner*! Insula Ceylon, *Gardner*! *Thwaites*!

87*. G. glaucescens, *Nees ab E.*

Hab. In mont. Nilgiri, *Perrottet* (fide *Montagne*).

88*. G. Reinwardtii, *Nees ab E.*

Hab. In insula Penang, *Gaudichaud.*

89. G. Thwaitesii, sp. n. Caule brevi, gracili, procumbente; foliis patentibus, lobo dorsali semicordato subquadratove acuto, ventrali ad medium cum dorsali connato late oblongo-lanceolato remotius spinoso-dentato; amphigastriis subquadratis, bifidis, spinoso-dentatis; perianthio ad apicem usque foliis vestito.

Hab. In insula Ceylon, *Thwaites*!

Caulis vix uncialis, statu sicco ad formas nonnullas *Isotachidi* (*Jungermannia* olim) *serrulatæ* accedens. Linea adglutinationis *lobi dorsalis* ad *ventralem* paulo supra marginem inferiorem excurrit, adeo ut margines loborum amborum infra lineam conjunctionis liberi relicti sunt. *Gottschearum* minima.

II. PHYSIOTIÆ.

1. PHYSIOTIUM, *Nees ab E.*

90. P. sphagnoides, *Nees ab E.*

Hab. In peninsula Malayana, ad Moulmein, *Parish*! et insula Ceylon, *Gardner*! *Thwaites*!

91. P. ACINOSUM, sp. n. Caule breviusculo, gracili, ramuloso; foliorum lobo dorsali ovato rotundato integerrimo, margine incurvo, auricula elongato-ovata basi clausa, superne aperta, marginibus inflexis integerrimis; involucralibus explanatis; perianthio abortivo cylindrico obtuso ore minuto integro, fertili apice plicato ore denticulato.

Hab. In insula Ceylon reg. temp., Adam's Peak, *Gardner*! *Thwaites*!

Pulvinatum. *Caulis primarius* ob multitudinem ramulorum fertilium perianthia turgida abortiva copiosa ferentium vix cernendus.

III. PTILIDIÆ.

1. PTILIDIUM, *Nees ab E.*

92. P. ciliare, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 7,000 ped., *J. D. H.*

93. P. trichophyllum, *Mitten.* (Jungermannia *auct.*)

Hab. In Himalayæ orient reg. temp. et subalp., Sikkim, alt. 11–13,000 ped., *J. D. H.*

Huc a *Jungermanniis,* habitu, foliis et amphigastriis speciem hanc diversam reposui.

2. SENDTNERA, *Endlicher.*

94. S. Woodsii, *Endlicher.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 10–12,000 ped., *H.f. et T.* (No. 1377, 1378).

95. S. diclados, *Endlicher.*

Hab. In Himalayæ orient. reg. trop., Sikkim, 1–2000 ped., *J. D. H.* (No. 1396). Silhet, *Wallich*! Penang, *Wallich*! et in. Ceylon, *Wight*! *Gardner*! *Maxwell.*

Crescit copiose inter muscos Ceylonicos, etiam per insulas maris Pacifici, longe protracta necnon in insulis Mascarenicis, ubi cum specie, ut videtur, altera, *S. Mascarenica,* amphigastriis marginibus reflexis basi copiose calcaribus laceris armatis, consociata est.

96. S. ochroleuca, *Nees ab E.*
Hab. In insula Ceylon (No. 1406), *Gardner*! *Maxwell*! inter muscos vulgaris.

97. J. juniperina, *Nees abE.*
Var. γ. ramosa. (S. dicrana, *Taylor, Griffith, Icon.* pl. 71. f. 4, 26.)
Hab. In Himalayæ orient. reg. temp. et alp., Sikkim et Nipal, alt. 7–14,000 ped., *J. D. H.* (No. 1379, 1387, 1386, 1389, 1381, 1393, 1382, 1383, 1402, 1380, 1384, 1392, 1395, 1400, 1388. 1394, 1391, 1401, 1390, 1397, 1398, 1403, 1399). Mont. Khasian. reg. subtrop. et temp., 3–5000 ped., *J. D. H. et T. T.* (No. 1405, 1385). Assam, *Griffith*! Insula Ceylon, *Gardner* (No. 1404, 1612).

3. Trichocolea, *Dumort.*

98. T. tomentella, *Nees ab E.*
Hab. Himalayæ orient. reg. temp., Sikkim, alt. 6–8000 ped., *J. D. H.* (No. 1407, 1408, 1410). Mont. Khasian. reg. temp. et subtrop., alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1409). Assam, *Griffith*!

IV. Trichomanoideæ.

1. Lepidozia, *Nees ab E.*

99. L. subintegra, *Ldbg.*
Hab. In insula Ceylon, ad Rambodde, et Horton Plains, *Gardner*!

100. L. flexuosa, sp. n. Caule erecto, pinnato, ramis flexuosis decurvis; foliis remotis, parvis, patentibus, quadratis, quadridentatis; amphigastriis minutis, quadridentatis.
Hab. In Himalayæ orient. temp., Sikkim, alt. 7–10,000 ped., *J. D. H.* (No. 1411, 1411 *b*). Mont. Khasiæ reg. subtropica et temperata, alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1415, 1456). Assam, *Griffith*!
L. microphylla gracilior, foliisque brevioribus. In speciminibus Khasianis No. 1415 *b* folia ramorum superiorum majora, oblonga, transitionem ad species *L. reptanti* affines indicant.

101. L. ceratophylla, sp. n. Caule erecto, brevi; foliis rigidis, patentibus, incumbentibus, ad basin in lacinias quatuor teretiusculas divisis; amphigastriis conformibus, bi- quadrifissis.
Hab. In Himalayæ reg. orient. temp., Sikkim, alt. 11,000 ped., *J. D. H.* (No. 1416).
Huic generi non certe referenda: quoad foliorum formam directionemque, *L. capillari* et *L. setaceæ* similis, major autem, structuraque rigidior.

102. L. setacea, *Mitten.* (Jungermannia setacea *auctorum.* Jungermannia quadridigitata, *Griff., Notulæ,* p. 314; *Icon.* pl. 71. f. 5, 28.)
Hab. In Himalayæ orient. temp., Sikkim, alt. 5–8000 ped., *J. D. H.*

Mont. Khasian. reg. subtrop., alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1419). Assam, *Griffith*!

103. L. Wallichiana, *Gottsche.*

Hab. In Himalaya centrali, Nipal, *Wallich*! In insula Ceylon, in monte Adam's Peak, *Thwaites*!

104. L. reptans, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp., Sikkim, 8–10,000 ped., *J. D. H.* (No. 1413, 1418, 1414).

Var. δ. tenera.

Hab. Yalloong, alt. 10,000 ped., *J. D.H.* (No. 1412).

105. L. BREVIFOLIA, sp. n. Caule procumbente pinnato, ramis flagelliformi attenuatis curvatis, foliis patentibus brevibus, subquadratis tridentatis incurvatis, minute areolatis, amphigastriis brevibus quadridentatis, foliis involucralibus iis *L. reptantis* similibus.

Hab. In Himalayæ orient. temp. et alp., 11–13,000 ped., *J. D. H.* (No. 1417).

L. reptanti perquam similis, folia tamen breviora minutiusque areolata.

2. MASTIGOBRYUM, *Nees ab E.*

106. M. inæquilaterum, *L. et Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich*!

107. M. echinatum, *Gottsche.*

Hab. In Himalaya centrali, Nipal, *Wallich.* E Borneo misit *Motley.*

108. M. vittatum, *Nees ab E.*

Hab. In insula Ceylon, in monte Adam's Peak, *Gardner*! (No. 1593).

109. M. Wallichianum, *Nees ab E.*

Hab. In Himalaya centrali, Nipal, *Wallich*!

110*. M. concavulum, *Nees ab E.*

Hab. In *Davallia parvula*, Singapore, *Wallich.*

111. M. IMBRICATUM, sp. n. Caule procumbente, dichotomo; foliis patentibus, late ovatis, apice incurvis, bi- quadridenticulatis; amphigastriis cordato-orbiculatis, subtruncatis, retusis dentatisve; foliis involucralibus ovatis, integris; perianthio ovato, ore denticulato.

Hab. In Himalayæ orient. reg. temp. et alp., Sikkim, alt. 7–14,000 ped. *J. D. H.* (No. 1421, 1427).

Habitu *M. deflexi*, sed cellulis foliorum majoribus.

112*. M. recurvum, *Ldbg.*

Hab. In insula Pulo-Penang, *Gaudichaud.*

113. M. erosum, *Nees ab E.*

Hab. In insula Pulo-Penang, *Wallich*!

114. M. deflexum, *Nees ab E.*

Hab. In Himalayæ orient. regione alp., Sikkim, alt. 12–14,000 ped., *J. D. H.* (No. 1423, 1433, 1607, 1596); et in montium Khasian. reg. temp., alt. 4000 ped., *J. D. H. et T. T.* (No. 1591).

115. M. alternifolium, *Nees ab E.*

Hab. In Himalayæ reg. temp. centrali et orient., Sikkim, 5–8000 ped., *J. D. H.* (No. 1420, 1428, 1592, 1601). Nipal, *Wallich.*

116. M. præruptum, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 4–11,000 ped., *J. D. H.* (No. 1430, 1431, 1425). Insula Ceylon, ad Horton Plains, *Gardner*! (No. 1594). Assam, *Griffith*!

117. M. decurvum, *Nees ab E.*

Hab. In peninsula Indiæ orientalis, *Wight*! Ceylon, ad Horton Plains, *Gardner*!

118. M. CEYLANICUM, sp. n. Caule horizontali, dichotomo; foliis ligulatis, decurvis, apice truncato-tridentatis, integerrimis; amphigastriis cuneiformi-quadratis, apice dentatis; perianthio oblongo, apice dentato; foliis involucralibus laciniatis, laciniis denticulatis.

Hab. In insula Ceylon, ad Rambodde, *Gardner*!

M. tridenti simile, folia tamen basi parum quam apice latiora, amphigastria diversiformia argutiusque dentata.

119* M. Indicum, *Gottsche et Ldbg.*

Hab. Singapore, in *Davallia parvula* cum *M. concavulo,* Wallich.

120. M. tridens, *Nees ab E.*

Hab. In Himalayæ orient. reg. temp., Sikkim, 6–8000 ped., *J. D. H.* (No. 1419 *b*, 1422, 1597); et in mont. Khasiæ, alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1600).

121. M. falcatum, *Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich*!

122. M. APPENDICULATUM, sp. n. Caule horizontali, dichotomo; foliis divergentibus recurvisque, ovato-linearibus, apice ut plurimum oblique truncatis tridenticulatis, basi margine ventrali auriculatis; amphigastriis subrotundis, breviter obtusissime dentatis, basi auriculatis, auriculis denticulatis.

Jungermannia, sp., *Griff. Notulæ,* p. 308, ex parte, *Icon. Plant. Asiat.* pl. 73. f. 3?

Hab. In Himalayæ orient. reg. temp., Sikkim, 7–8000 ped., *J. D. H.* (No. 1595). Assam, *Griffith*!

Auriculis foliorum et amphigastriorum a consimilibus distinctum. *M. tridente* major.

123. M. HIMALAYANUM, sp. n. Caule horizontali, dichotomo; foliis

divergentibus recurvisque, linearibus, truncatis, integerrimis; amphigastriis subrotundis, rotundato-dentatis.

Hab. In Himalayæ orient. reg. temp., Sikkim, 8–10,000 ped., *J. D. H.* (No. 1426, 1432, 1424, 1429).

M. appendiculato perquam simile, sed amphigastria minora auriculis nullis. Ad amphigastriorum apices substantiam fusco-nigram gummosam quasi exsudationem in speciminibus omnibus obviam inveni.

124. M. OBLONGUM, sp. n. Caule horizontali, dichotomo; foliis patentibus, ovato-lanceolatis, truncatis, tridenticulatis, marginibus subundulatis, cellulis ad medium folii majoribus; amphigastriis oblongis, truncatis, subintegerrimis.

Hab. In Himalayæ orient. reg. subtrop. et temp., Sikkim, alt. 4–10,000 ped., *J. D. H.* (No. 1434, 1590).

M. Javanico parum major, amphigastriis longis cauli adpressis et textura foliorum ab affinibus diversum.

125. M. INTERMEDIUM, sp. n. Caule horizontali, dichotomo; foliis divergentibus, ovali-oblongis, obtusis, tri- quinquedenticulatis, cellulis ad medium folii majoribus; amphigastriis quadrato-rotundatis, crenatis.

Hab. In insula Ceylon, ad Rambodde, *Gardner*!

Species quasi intermedia inter *Mastigobrya M. integro* affinia et ea quæ folia tridenticulata habent, his ambitu foliorum oblongo-ovali, illis denticulatione subabrupta proxima.

126. M. OBTUSATUM, sp. n. Caule horizontali, dichotomo; foliis patentibus decurvisque, ovatis, apice obtuse uni- tridentatis, rotundatis integerrimisve; amphigastriis quadratis, apice obtuse crenatis; cellulis foliorum uniformibus.

Hab. In insula Ceylon, *Gardner*! (No. 1598).

M. oblongo et *M. intermedio* simile, foliorum autem cellulis ubique uniformibus et amphigastriis magis quadratis diversum.

3. CALYPOGEIA, *Raddi.*

127. C. MARGINELLA, sp. n. Caule prostrato, parce ramoso; foliis suborbiculatis, integerrimis, cellulis interstitiis teneris, marginalibus distinctis longioribus; amphigastriis parvis, subreniformibus, bidentatis, integerrimis.

Hab. In montium Khasian. reg. subtrop., alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1339).

Formis majoribus *C. Trichomanis* similis, sed foliis basi latioribus distincte marginatis.

128. C. Trichomanis, *Corda.*

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 10,000 ped., *J. D. H.* (No. 1606). Montium Khasian. reg. trop., alt. 2–4000 ped., *J. D. H. et T. T.*

129. C. ÆRUGINOSA, sp. n. Caule procumbente, teretiusculo; foliis patentibus, orbiculatis, concavis, e cellulis parvis areolatis; amphigastriis magnis, orbiculatis, sinu parvo emarginatis, integerrimis.

Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 12,000 ped., *J. D. H.*! (No. 1319).

A congeneribus, foliis convexis amphigastriisque magnis orbiculatis semitereti-imbricatis remota. *Color* æruginosus obscurus.

130. C. LUNATA, sp. n. Caule prostrato, ramis nonnullis flagelliformi-attenuatis; foliis patentibus, late ovatis, apice angulatis plus minus distincteve bidentatis, integerrimis; amphigastriis caule triplo latioribus, semiorbiculatis, sublunatis, apice dentatis.

Hab. In Assam superiore, *Griffith*!

Amphigastriis magnis lunatis statim dignoscenda.

V. PLATYPHYLLÆ.

1. RADULA, *Nees ab E.*

131. R. Javanica, *Gottsche.*

Hab. In Himalayæ centralis et orientalis reg. temp., Nipal, *Wallich*! Sikkim, alt. 8–10,000 ped., *J. D. H.* (No. 4440). Mont. Khasian., alt. 4000 ped., *J. D. H. et T. T.* (No. 1438). Insula Ceylon, *Thwaites*! *Gardner*! *Wight*!

132. R. COLLICULOSA, sp. n. *R. Javanica* paululum gracilior et flaccidior, lobulis paulo latioribus basin versus colliculo prominente instructis.

Hab. In insula Ceylon, *Gardner*! *Thwaites*! Etiam ex Java sub nom. *R. Javanica* a cl. Van der Sande-Lacoste et beato Dozy accepi. Etiam hujus loci est illa *R. Javanica* a Menzies ab Owyhee insularum Sandwicensium relata.

133. R. OBSCURA, sp. n. Caule gracili, pinnato; foliis ovato-rotundatis, lobulo parvo subquadrato convexo saccato, supra caulem non protracto, angulo subobtuso; perianthio longiusculo, infundibuliformi, ore truncato plano.

Hab. In montium Khasian. reg. subtrop. et temp., alt. 3–5000 ped., *J. D. H. et T. T.* (No. 1435 *b*, 1463).

Caulis circiter uncialis, flaccidus, supra muscos effusus. Colore obscuro *R. Javanicæ* similis; *R. Grevilleanæ* Taylori tamen affinis.

134. R. formosa, *Nees ab E.*

Hab. In insula Ceylon (No. 1442), *Gardner*! *Thwaites*!

135. R. complanata, *Dumort.*

Hab. In Himalayæ boreali-occid. reg. temp., Kunawar, alt. 7000 ped., *T. T.* (No. 1437). Simla, 8000 ped., *T. T.* (No. 1436). In Himalayæ orient. reg. temp., Sikkim, 5–8000 ped., *J. D. H.* (No. 1441).

2. Madotheca, *Dumort.*

136. M. acutifolia, *Lehm. et Ldbg.*
Hab. In montium Khasian. reg. trop., alt. 24,000 ped., *J. D. H. et T. T.* (No. 1573). Mont. Nilghiri, *Gardner*! Ceylon, *Wight*!

137. M. ciliaris, *Nees ab E.*
Hab. In insula Ceylon, *Gardner*! (No. 1570).

138. M. Perrottetii, *Mont.*
Hab. In montibus Nilgiri, *Perrottet*!

139 *. M. Nilghiriensis, *Mont.*
Hab. In montibus Nilgiri, *Perrottet.*

140. M. ligulifera, *Taylor.*
Hab. In montium Khasian. reg. temp., alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1563, 1573 *b*). Mont. Nilghiri, *M'Ivor*!

141. M. campylophylla, *Lehm. et Ldbg.* (Jungermannia neckeroides, *Griff.*, *Notulæ*, p. 313, *Icon.* pl. 70. f. 25 ?)
Hab. In Himalayæ orient. reg. temp., Sikkim, alt. 10,000 ped., *J. D. H.* (No. 1565, 1565 *b*). Assam, *Griffith*!

142. M. revoluta, *L. et Ldbg.*
Hab. In Himalaya centrali, Nipal, *Wallich*!

143. M. ptychantha, sp. n. Caule strictiusculo, pinnato; foliis divergentibus, ovato-oblongis obtusis, margine ventrali recurvis, apice breviter 4–6-dentatis, cæteroquin integerrimis, lobulo linguæformi; amphigastriis oblongo-lingulatis, apice retusis; perianthio elongato-elliptico compresso, dorso tri-, ventre quadriplicato, ore minute dentato; foliis involucralibus trifidis, laciniis obtusis.
Hab. In Himalayæ orient. reg. subtrop., Sikkim, alt. 3–4000 ped., *J. D. H.* (No. 1556),
Habitu peculiariter stricto et structura perianthii *Radulæ multicarinatæ* analoga.

144. M. plumosa, sp. n. Caule flexuoso, eleganter plumiformi-pinnato; foliis divergentibus, oblongo-ovatis obtusis, margine ventrali parum recurvo, apice parce denticulato, cæteroquin lævi, lobulo parvo linguæformi; amphigastriis caulis latitudine, oblongis obtusis; perianthio elliptico compresso, dorso convexo, ventre unicarinato, ore denticulato; foliis involucralibus minoribus, conformibus.
Hab. In montium Khasian. reg. subtrop., alt. 4000 ped.! *J. D. H. et T. T.* (No. 1567).
M. Sieboldi et *M. porellæ* similis, sed foliorum forma denticulationeque confinibus diversa. Facies *Radulæ Javanicæ.*

145. M. lævigata, *Dumort.*
Hab. In Himalayæ et Tibetiæ occidentalis reg. temp., Kashmir, alt. 6000

ped., *T. T.* (No. 1564); Nubra, alt. 11,000 ped., *T. T.* (No. 1571); Simla, 7000, *T. T.* (No. 1569); Kumaon, *Strachey et Winterbottom*!

146. M. platyphylloidea, *Dumort.*

Hab. Himalaya et Tibetia occidentali temperata, Simla, 7-8000 ped., *T. T.* (No. 1562, 1568); Nubra, alt. 11,000 ped., *T. T.* (No. 1572).

VI. Jubuleæ.

1. Bryopteris, *Ldbg.*

147*. B. Trinitensis, *Lehm. et Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich.*

2. Ptychanthus, *Nees ab E.*

148. P. striatus, *Nees ab E. Griff. Icon. Plant. Asiat.* pl. 72. f. 4; *Notulæ*, p. 303.

Hab. In Himalayæ reg. subtrop. et temp., Kumaon, *Strachey et Winterbottom*! Nipal, *Wallich*! Sikkim, alt. 7-10,000 ped. (No. 1457, 1462, 1464, 1458, 1464 *b*, 1461, 1473, 1468), alt. 1000 ped., *J. D. H.* (No. 1467); montibus Khasiæ, alt. 5-6000 ped., *J. D. H. et T. T.* (No. 1460, 1475, 1477, 1470). Assam trop., ad Gowhatty, *Simons*; et Assam superiore, *Griffith*!

149*. P. Wightii, *Gottsche.*

Hab. In peninsula Indiæ orientalis, *Wight.*

3. Lejeunia, *Gottsche et Ldbg.*

A. *Amphigastria integra.*

150. L. comosa. (Thysananthus, *Ldbg.*).

Hab. In Penang, *Wallich*! Etiam in insulis Philippinens., *Cuming*! In speciminibus hujus speciei in Herbario Hookeriano "Guiana" inscriptis fragmenta nonnulla plantularum ipsissimarum ut in illis a Wallichio in Penang lectis inveni; ergo speciem mere Indicam mihi persuasum est.

151. L. spathulistipa. (Thysananthus, *Ldbg.*).

Hab. In Ceylon, ad Newera Ellia, ad ramulos arborum, *Gardner*! Assam, *Griffith*!

152. L. Wardiana, sp. n. Caule dichotome ramoso, foliis divergentibus, oblongis, apice oblique subtruncatis acutis, margine ventrali incurvis lobulo quadrato apice bidentato inflexo, amphigastriis obovatis, sed reflexione apicis marginumque ambitu obcordatis integerrimis, perianthio oblongo obtuso dorso lævi ventre unicarinato angulis lævibus foliis amphigastrioque involucrali integerrimis.

Hab. In Assam superiore, *Griffith*!

Habitu, colore et magnitudine *L. spathulistipæ* conveniens, sed foliis amphigastriis et perianthio angulis ubique integerrimis. Clarissimo N. B. Ward, qui specimina sua omnia a Griffithio accepta mihi liberaliter communicavit, hanc speciem dedicavi.

153. L. UNGULATA, sp. n. Caule dichotome ramoso subunciali, foliis patentibus ovali-oblongis obtusis, apice dentatis, lobulo angusto dente unico spinoso inflexo armato, amphigastriis subrotundis superne dentatis, perianthio obovato compresso alato, ala dentata, dorso uni-, ventre tricarinato, foliis involucralibus acutioribus magis dentatis, amphigastrio magno exciso dentato.

Hab. In Pegu, ad Rangoon, *M'Clelland*! *Meteorio squarroso* intermixta.

Habitus *L. spathulistipæ*, flaccidior vero, foliis patentibus non decurvis et perianthio diversa.

154. L. Cumingiana. (Phragmicoma, *Mont.* P. Malaccensis, *Taylor.*)

Hab. Malacca, *Cantor*!

155. L. repleta. (Phragmicoma, *Taylor.*)

Phragmicoma versicolor, L. et L., quoad specimina Indica.

Hab. In Himalaya centrali, Nipal, *Wallich*! Mont. Khasia reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.* Madras, *Wight*! Insula Ceylon, *Thwaites*!

156. L. ligulata, *L. et Ldbg.*

Hab. In Penang, *Wallich*; etiam in Borneo, *Motley*! et in Tahiti, *Beechey*! invenitur.

157. L. Lindenbergii, *Gottsche.*

Hab. In Himalaya centrali et orientali temperata, Sikkim, 6–10,000 ped., *J. D. H.* (No. 1505, 1517). Nipal, *Wallich.*

158. L. subfusca, *Nees ab E.*

Hab. In montibus Khasiæ reg. trop., alt. 3–4000 ped., *J. D. H. et T. T.* (No. 1481, 1514). Madras, *Wight*! Insula Ceylon, *Gardner*! (No. 1479, 1480).

159. L. adplanata, *Nees ab E.*

Hab. In Himalaya centrali et orientali temp., Nipal, *Wallich*! Sikkim, alt. 7000 ped., *J. D. H.* Mont. Khasian., alt. 4000 ped.; insula Ceylon, *Gardner*!

160. L. TURGIDA, sp. n. Caule procumbente prostratove sesquiunciali laxe pinnatim ramoso, foliis ovali-subrotundis obtusis concavis, margine ventrali sæpe omnino incurvis, lobulo marginis dimidium occupante, amphigastriis orbiculatis planis, perianthio oblongo obovatove compresso, dorso læviter uni- ventre biplicato.

Hab. In Himalayæ orient. reg. temp. Sikkim, alt. 8000 ped., *J. D. H.* Mont. Khasia, alt. 5–6000 ped., *J. D. H. et T. T.* Inter *Sendtneram juniperinam.* In Ceylon, *Gardner*! *Thwaites*!

161. L. semirepanda. (Phragmicoma, *Nees ab E.*)
Hab. In Himalaya centrali et orientali reg. subtrop. et temp. Nipal, *Wallich*! Sikkim, alt. 4–11,000 ped., *J. D. H.* (No. 1471, 1491, 1465, 1469, 1478, 1455, 1486). Mont. Khasian., alt. 4–6000 ped., *J. D. H. et T. T.* (No. 1489). Insula Ceylon, *Thwaites*!

162. L. pycnoclada. (Phragmicoma, *Taylor.*)
Hab. In peninsula Malayana ad Malacca, *Cantor*! Insula Ceylon, ad Peradenia, *Gardner*! Crescit etiam in Hong-Kong, *Bowring*!

163. L. fertilis. (Phragmicoma, *Nees ab E.*)
Hab. In insula Ceylon, *Thwaites*!

164. L. tumida, *N. et M.*
Hab. In insula Penang, *Hb. N. et M.*

165. L. PLANIUSCULA, sp. n. Caule procumbente vix unciali subsimplici, foliis patentibus oblongis, apice rotundatis, decurvis, margine ventrali sinuato-incurvis, lobulo parvo inflexo bidentulo, amphigastriis orbiculatis, marginibus varie decurvis, perianthio obovato compresso dorso uni- ventre bicarinato, carinis apice tuberculoso-dentatis, amphigastrio involucrali apice repando subdentato.
Hab. Pegu ad Rangoon, inter *L. ungulatæ* et *Meteorii squarrosi* cæspites, *M'Clelland.*
Facies *L. fertilis*, sed forma directioneque foliorum distincta.

166*. L. Pulopenangensis. (Phragmicoma, *Gottsche.*)
Hab. In insula Penang, *Hb. Montagne.*

167. L. PERADENIENSIS, sp. n. Caule procumbente unciali fusco vage pinnato, foliis patentibus ovato-rotundatis, margine ventrali toto incurvis sub-sinuatis, lobulo angulato minuteque denticulato, amphigastriis obcordatis retusis marginibus recurvis. perianthio compresso, dorso uni- ventre bicarinato, amphigastrio involucrali apice exciso.
Hab. In insula Ceylon, ad arbores, Peradenia, *Gardner* (No. 1474).
L. fertili affinis quoad formam directionemque foliorum, robustior tamen cellulisque opacioribus.

168. L. INFUSCATA, sp. n. Caule procumbente gracili fusco unciali dichotome ramoso, foliis patentibus divergentibusque ovato-oblongis obtusis, lobulo amplo planiusculo profunde saccato angulato minute bidentato, amphigastriis suborbiculatis, margine apiceque varie decurvis.
Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; Sikkim, alt. 4–8000 ped., *J. D. H.*! Mont. Khasiæ regione subtropica, alt. 4–6000 ped., *J. D. H. et T. T.*! (No. 1513, 1515).

169. L. SACCATA, sp. n. Caule unciali procumbente fusco-viridi flaccido, foliis oblongo-rotundatis obtusis, apice incurvis, lobulo profunde

saccato magno planiusculo apice angulato tri- quadridenticulato, amphigastriis magnis orbiculatis, basi cordatis, apice reflexis.

Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; inter cæspitulos *Anthocerotis glandulosi,* Sikkim, alt. 7000 ped. (No. 1476), *J. D. H.* Mont. Khasia, subtrop. (No. 1503), *J. D. H. et T. T.*

L. infuscatæ similis, diversa tamen foliis magis divergentibus obtusioribus, colore pallidiore, amphigastriis majoribus, apice reflexis.

107*. L. squamata, *Nees ab E.*

Hab. "India orientalis," *Willd. Hb. Weber.*

B. *Amphigastria bifida.*

1. *Folia orbiculata.*

171. L. SERPENTINA, sp. n. Caule gracili sesquiunciali vage pinnato, foliis patentibus orbiculatis, lobulo parvo unidentato, amphigastriis parvis rotundatis ad medium bifidis, perianthio obovato compresso, dorso concavo, ventre obtuse bicarinato.

Hab. In insula Ceylon, *Gardner*!

L. sordidæ, L. contiguæ et *L. Œrstedianæ* forma foliorum affinis, sed gracilis amphigastriis parvis. *L. Wightii* quoad magnitudinem æmulans. Color luridus; rete spissum eo *L. rufescentis* simile.

Icon Lacosteanum *L. decursivæ,* quoad habitum magnitudinemque plantularum satis convenit, lobulo verum in *L. serpentina* minore, areola densiore et perianthio diversa.

172. L. Wightii, *Ldbg.*

Hab. In Himalaya orientali temperata, Sikkim, 4–7000 ped. (1508, 1483, 1487), *J. D. H.*; mont. Khasia, alt. 5000 ped. (1451), *J. D. H. et T. T.*

173*. L. Wallichiana, *Lehm.*

Hab. India orientalis (ad *Potentillam rigidam*), *Wallich.*

174. L. FIRMA, sp. n. Caule gracili vix unciali vage parce ramoso, foliis divergentibus oblongis, apice rotundatis, lobulo ad marginis ventralis dimidium producto unidentato, amphigastriis parvis rotundatis breviter bifidis, perianthio oblongo obovato compresso, dorso uni-, ventre bicarinato.

Hab. In montibus Merakkin, Khasia subtrop., alt. 4000 ped., *J. D. H. et T. T.*

L. catenulatæ, Nees ab E., forma directioneque foliorum similis, sed amphigastriis diversis, folia vel sicco vel humido vix mutantur.

2. *Serpyllifoliæ.*

175. L. OBSCURA, sp. n. Caule repente flaccido vage ramoso, foliis patentibus ovalibus obtusis, lobulo minuto nullove, amphigastriis

parvis rotundatis, ad medium bifidis, perianthio obovato quinquangulato.

Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; Sikkim, alt. 5–6000 ped., *J. D. H.* (No. 1420).

Obscure viridis. Habitu *L. Wightii*, sed tenerior et flaccidior.

176. L. SUBACUTA, sp. n. Caule vage pinnatim ramoso gracili, foliis patentibus ovatis obtusis interdum angulatis, lobulo parvo unidentato, amphigastriis parvis rotundatis ad medium bifidis, perianthio acute æqualiter quinquangulato.

Hab. In Himalaya orientali temperata, Sikkim, alt. 7000 ped., *J. D. H.* Mont. Khasia subtropica et temperata, alt. 3–5000 ped., *J. D. H. et T. T.* (No. 1449, 1504).

L. Wightii major, foliisque sæpe subacuminatis, nunquam vero apiculatis.

177. L. FLAVIDA, sp. n. Caule vage ramoso flaviusculo, foliis patentibus ovatis, apice rotundatis, lobulo majusculo tumido subsaccato, amphigastriis cordatis, ad medium bifidis, laciniis acutis, perianthio obovato, obtuse æqualiter quinquangulato.

Hab. Insula Ceylon, *Gardner*!

L. serpyllifolia duplo major, rigidior, amphigastriisque cordatis diversa.

178. L. RIPARIA, sp. n. Caule cæspitoso brevi vage ramoso obscure viridi, foliis divergentibus ovatis apice rotundatis, lobulo minuto nullove, amphigastriis parvis rotundis ad medium bifidis, laciniis acutis, perianthio oblongo parum compresso, obtuse quinqueplicato.

Hab. In insula Ceylon, ad ripas fluminis Maha-nelle-ganga, Peradenia, *Gardner*!

Affinis *L. serpyllifoliæ*, sed aliquantulo major, lobulo perianthioque diversiformis.

179. L. APPENDICULATA, sp. n. Caule brevi vage ramoso exili pallido, foliis patulis ovali-orbiculatis, margine dorsali ambitu rotundato, ventrali sub apicem rotundatum sinuato toto fere in lobulum tumidum inflexo, amphigastriis parvis orbiculatis breviter bifidis, perianthio oblongo obtuse quinqueplicato, foliis involucralibus lobo dorsali ovato subacuto, ventrali ligulariformi e pagina lobi dorsalis oriente, folium quasi alatum formantibus.

Hab. In Himalaya orientali temperata, Sikkim, alt. 6000 ped., *J. D. H.*!

Folia inflexione marginis ventralis devexa. Superpositione lobuli foliorum involucralium ut mos est *Gottschearum* facile distincta. *L. serpyllifolia* minor.

180. L. ALIGERA, sp. n. Caule minuto pallido, foliis erecto-patentibus ovatis obtusis, lobulo ovato tumido, dimidium folii æquante, amphigastriis subrotundis bifidis, perianthio ovato-oblongo obtuso compresso, quinqueplicato, foliis involucralibus lobis subæqualibus acutis, a basi ad excisuram lobulorum latiuscule alatis, ala integerrima angulatave.

Hab. In montibus Khasia, regione temperata, alt. 5–6000 ped., *J. D. H. et T. T.*

Facies *L. minutissimæ*; a *L. appendiculata* foliis involucralibus vere alatis distincta.

181. L. COCOES, sp. n. Caule repente effuso exili vage ramoso, foliis patentibus ovatis obtusis, lobulo parvo tumidulo unidentato, amphigastriis parvis ad medium bifidis, perianthio ovato-oblongo obtuso, acute quinquangulato.

Hab. Ad truncos *Cocoes nuciferæ*, Balagom, Ceylon, *Gardner* (No. 1499).

Color, habitus, magnitudoque *L. serpyllifoliæ*; perianthio verum magis ovato diversa.

182*. L. imbricata, *Nees ab E.*

Hab. In insula Pulo Penang, inter *L.* (*Phrag.*) *lingulatam.*

183*. L. Ceylanica, *Gottsche.*

Hab. In insula Ceylon (inter *Radulam Javanicam*), *Wight.*

184. L. OBFUSCA, sp. n. Caule effuso exili vage ramoso, foliis divergentibus orbiculato-ovatis, apice nonnunquam angulatis, lobulo parvo involuto, amphigastriis parvis ad medium bifidis, perianthio clavato obtuso, apice acute quinqueplicato, inferne tubuloso plicis nullis.

Hab. In insula Ceylon, *Gardner.*

Magnitudine *L. serpyllifoliæ* similis, sed colore fusco et perianthio distincta.

185. L. LÆVIUSCULA, sp. n. Caule decumbente subunciali obscure flavo-viridi vage ramoso, foliis divaricatis oblongo-ovatis obtusis, lobulo planiusculo subquadrato, tertiam partem folii longitudinis æquante, amphigastriis mediocribus orbiculatis, breviter bifidis, perianthio obovato obtuso compresso, dorso lævi, ventre latiuscule uniplicato, amphigastrio involucrali apice retuso fere integro.

Hab. In Himalaya orientali temperata, Sikkim, alt. 6000 ped., *J. D. H.*

Magnitudine et colore *L. Lindenbergii* accedens, brevior tamen, quoad perianthii formam a nube specierum *Lejeuniarum serpyllifoliarum* statim distincta.

186*. L. orientalis, *Gottsche.*

Hab. In India orientali.

187*. L. serpyllifolia.

Hab. In India orientali continentis, *Synops. Hepat.*

188*. L. læta, *L. et Ldbg.*

Hab. In peninsula Indiæ orientalis, *Hb. L., G. et N.*

189. L. FLEXUOSA, sp. n. Caule procumbente gracili unciali subpinnatim ramoso, foliis patentibus ovato-rotundatis, interdum obtuse angulatis, lobulo parvo unidentato, amphigastriis cordatis ad medium bifidis.

Hab. In Himalaya centrali et orientali, Nipal, *Wallich*; Sikkim, alt. 10,000 ped., *J. D. H.* In mont. Khasia reg. subtropica, alt. 4000 ped., *J. D. H. et T. T.*

Colore habitu magnitudineque cum *L. rufescènte* conveniens, caule autem longiore et foliis patentioribus recedens.

190. L. Gardneri, sp. n. Caule procumbente sesquiunciali subpinnato, foliis patentibus ovatis, apice incurvis, lobulo dimidium marginis ventralis æquante inflexo, amphigastriis parvis cordato-orbiculatis, ad medium bifidis, perianthio obovato fere turbinato, obtuso, compresso, dorso uni- ventre bicarinato.

Hab. In insula Ceylon, *Gardner*.

L. decursivæ et *L. serpentinæ* similis, robustior tamen, foliis margine ventrali recto lobulo magno et perianthio distincta.

191. L. gracillima, sp. n. Caule cæspituloso minuto, foliis remotiusculis erectis oblongis obtusis, areolis magnis, lobulo magno folii ½ æquante, amphigastriis minimis caule vix latioribus profunde bifidis, perianthio oblongo obtuso compresso obtuse quinquangulato.

Hab. In insula Ceylon, ad corticem arborum Point Galle, *Gardner* (No. 1500).

L. minutissimæ similis, sed minor, foliis cauli parallelis et perianthio compresso aliena.

192*. L. tenella, *Taylor*.

Hab. In peninsula Malayana ad Singapore, ad *Dicranum fragilem*, *Wallich*.

193*. L. punctiformis, *Taylor*.

Hab. In India orientali, *Wight*, *Hb. Greville*.

194*. L. minutissima, *Dumort*.

Hab. In mont. Nilgiri, in *Frullania glomerata*, *Perrottet*.

195*. L. cucullata, *Nees ab E.*

Hab. In mont. Nilgiri, *Perrottet*.

3. *Folia acuta.*

196. L. Nilgiriana, *Gottsche*.

Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; Sikkim, alt. 7000 ped. (No. 1450), *J. D. H.*; in mont. Khasia, alt. 4000 ped., subtrop., *J. D. H. et T. T.*; in montibus Nilgiriensibus, *Perrottet*.

197. L. Khasiana, sp. n. Caule procumbente vage ramoso semunciali, foliis divaricatis, ovatis, apice angulatis acutisque, lobulo parvo inflexo, amphigastriis parvis orbiculatis, ad medium bifidis, perianthio obovato subelliptico retuso compresso, dorso uni- ventre bicarinato.

Hab. In montibus Khasia (inter *Macromitrias* ad *Frullaniam Wallichianam*), regione subtrop. alt. 4000 ped., *J. D. H. et T. T.* (No. 1516).

L. rufescenti similis, sed foliis omnibus angulatis acutis et perianthio medium versus latiore discedens.

198. L. ANGUSTIFOLIA, sp. n. Caule gracillimo capillari fusco parce ramoso, foliis erecto-patentibus, lanceolatis acuminatis incurvis, lobulo magno ovato tumido bidentulo, amphigastriis nullis.

Hab. In Himalaya orientali temperata, Sikkim, alt. 10,000 ped. (inter muscos), *J. D. H.* (No. 1498).

Gracillima, vix oculis nudis conspicua.

4. *Folia denticulata.*

199. L. VESICULOSA, sp. n. Caule effuso exili vage ramoso, foliis patentibus, ovatis acuminatis, acumine incurvis, ambitu cellulis prominentibus laxis anguloso-crenatis, lobulo ovato dimidium folii longitudinis metiente, inferne cellulis prominulis quasi vesiculato, amphigastriis minutis divaricato-bidentatis, perianthio oblongo obtuso compresso quinquangulato, foliis involucralibus dentatis.

Hab. In insula Ceylon, ad *Macromitrias, Gardner.*

Habitus magnitudoque *L. hamatifoliæ*; folia autem latiora, magis decurva, nec dentata, et perianthia non cristata.

200. L. venusta, *Van der Sande-Lacoste, Synops. Hepat. Javanicarum,* p. 64, t. 12.

Hab. In montibus Khasia, regione subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1501).

201. L. SUBOPACA, sp. n. Caule repente vage ramoso exili, foliis oblongo-ovatis acutis ubique eroso-crenulatis, cellulis subopacis, lobulo parvo inflexo ad tertiam folii partem protracto, amphigastriis parvis ovato-rotundatis, ad medium bifidis.

Hab. In montium Khasia regione temp., alt. 5000 ped., *J. D. H. et T. T.* (No. 1512).

L. serpyllifoliæ quoad magnitudinem similis, *L. denticulatæ* vero propinquior, attamen foliis longioribus acutioribus opacioribusque recedens.

202. L. PULLA, sp. n. Caule repente effuso parvulo, foliis patentibus oblongo-ovatis acutis dentatis, lobulo tumidulo unidentato, ad dimidium marginis ventralis metiente, amphigastriis profunde bifidis, laciniis lanceolatis, foliis involucralibus lacero-dentatis.

Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; Sikkim (inter muscos, &c.), alt. 6–8000 ped., *J. D. H.* (No. 1488, 1452, 1453).

A *L. calcarea* quocum magnitudine convenit, colore fusco foliisque oblongo-ovatis lævibus, nec acuminatis, differt.

203. L. MACRODONTA, sp. n. Caule effuso minutissimo, foliis patentibus, ambitu (dentibus inclusis) subquadratis, margine dorsali in dentes tres lanceolatos validos profunde discretis unoque parvo apicem folii exhibente, lobulo magno totum fere marginem ventralem occupante unidentato, amphigastriis parvis ovatis profunde bifidis, perianthio

turbinato quinqueplicato angulis acuminatis acutis, foliis involucralibus dentatis.

Hab. In insula Ceylon, ad ramos *Neckeræ Javanicæ*, Gardner.

L. hamatifoliæ minor, denticulatione foliorum a confinibus longe diversa.

204. L. Singapurensis, *Ldbg.*

Hab. In peninsula Malayana ad Singapore, *Wallich.*

5. *Examphigastriata.*

205. L. PRODUCTA, sp. n. Caule effuso brevi planiusulo pallido, foliis ovatis, apice rotundatis, lobulo basi saccato lingulato cauli parallelo, amphigastriis nullis, at eorum loco punctis radicellarum ad basin foliorum omnium obviis, perianthio obovato compresso, dorso convexo, ventre bicarinato.

Hab. In Himalaya orientali temperata, Sikkim, alt. 4–7000 ped. ad muscos, *J. D. H.*

Habitus et magnitudo *L. albifoliæ* et *L. unidentatæ*; forma autem lobulorum singularis, *Radulam lingulatam* referens.

206. L. INFLECTENS, sp. n. Caule effuso brevi planiusculo pallido, foliis divergentibus oblongis rotundatis, apice incurvis, lobulo magno ovali saccato tumido longitudinem folii æquante, dentibus binis cauli unguiformi infixis, amphigastriis vestigiisve radicellarum punctorum nullis, perianthio oblongo obovato, dorso depresso leniter uni- ventre convexo bicarinato, amphigastrio involucrali nullo!

Hab. In insula Ceylon, inter *Macromitrias* Horton Plains, *Gardner.*

L. producta robustior, coloreque obscurior.

207. L. PLANISSIMA, sp. n. Caule brevi planissimo effuso, foliis patentibus ovali-oblongis obtusissimis, lobulo elliptico basi a caule fere discreto, tumidulo, dimidium folii longitudinis æquante, amphigastriis nullis, punctis radicellarum duplicatis, perianthio obovato compresso dorso ventreque convexo lævi, amphigastrio involucrali nullo!

Hab. In insula Ceylon, ad corticem arborum Point Galle, *Gardner* (No. 1493).

L. Pauckertii affinis, planissima tamen, quasi ad corticem adglutinata, ut primo visu folia a se discreta vix discerni possunt.

208. L. LONGIFOLIA, sp. n. Caule effuso brevi flavo-fusco, foliis patentibus elliptico-lanceolatis integerrimis flexuosis, lobulo longiusculo tumidulo, amphigastriis nullis, punctis radicellarum duplicatis.

Hab. In Himalaya orientali temperata, Sikkim, alt. 4–8000 ped., *J. D. H.* (No. 1496).

Habitu *L. calyptrifoliæ*, sed fusca foliisque planis.

6. *Acrogonia.*

209. L. THWAITESIANA, sp. n. Epiphylla, caule e centro radiatim effuso gracili, vage ramoso, pallide flavo-fusco, foliis divaricatis decurvatis

ovatis obtusis, apicem versus parce denticulatis, seriebus circiter tribus plus minus distinctis cellularum æquidistantium heteromorpharum notatis, lobulo parvo involuto, amphigastriis parvis inconspicuis e laciniis duabus lanceolatis divaricatis, perianthio subturbinato quinquangulato retuso, angulis in cornua tumida obtusissima productis.

Hab. In insula Ceylon, ad folia, *Thwaites.*

L. falsinervi, Van der Sande-Lacoste, magnitudine similis. Species pulchra et distinctissima.

210. L. MACULATA, sp. n. Epiphylla, caule effuso subpinnatim ramoso pallide fusco, foliis patentibus oblongo-ellipticis acutis, margine dorsali rectiusculo, ventrali convexo apicem versus denticulato, cellulis heteromorphis quatuor serie unica recta dispositis, infima majore lobulo parvo tumidulo involuto semiocculta, amphigastriis laciniis angustis lanceolatis patentibus.

Hab. In insula Ceylon, Pas-dum-Korle, *Gardner* (No. 1494).

L. Thwaitesiana minor, atque ad folium arctius adpressa repens.

211. L. EPIPHYLLA, sp. n. Caule effuso divaricato ramoso, foliis patentibus oblongo-trapezoideis obtusiusculis integerrimis, cellulis heteromorphis binis trinisve distinctis subseriatim dispositis, lobulo angusto nullove, amphigastriis brevissimis in lacinias longas subulatas a caule patulo-divergentes divisis, perianthio brevi quinquangulato, angulis prominentibus subcornutis perianthium ambitu turbinatum efformantibus.

Hab. In insula Ceylon, ad folia, Padacumbra, *Gardner* (No. 1495).

Obscure flavo-viridis, *L. maculata* parum minor, foliis autem integerrimis aliter maculatis distincta.

212. L. DIVERSIFOLIA, sp. n. Epiphylla, caule effuso intricato fusco, foliis patentibus lingulatis, basi angustatis, apice rotundatis angulatis acutis subtruncatisve, cellulis heteromorphis binis trinisve in seriem dispositis, lobulo parvo bidentulo incurvo, amphigastriis nullis, punctis radicellarum duplicatis.

Hab. In Himalaya orientali temperata et subtropica, alt. 4–8000 ped.! *J. D. H.* (No. 1497).

Ad basin foliorum omnium fasciculus haustellorum invenitur iis congruentium quæ in speciebus amphigastriis duplicatis obvia.

4. FRULLANIA, *Raddi.*

213. F. WALLICHIANA, sp. n. Caule procumbente pinnato, foliis divergentibus suborbiculatis apice incurvis, lobulo galeato quasi ad medium folii insidente longe appendiculato, amphigastriis magnis cordato-orbiculatis apice sinu parvo bidentatis, perianthio compresso, dorso tri- ventre quinqueplicato, foliis involucralibus inferne connatis marginibus loborum superiorum breviter ciliato-dentatis.

Hab. In Himalaya centrali et orientali tropica et temperata, Nipal, *Wallich*; Sikkim, alt. 4-10,000 ped. (No. 1520, 1523), et trop., alt.

1–4000 ped., *J. D. H.* (No. 1544); mont. Khasia, alt. 4000 ped., *J. D. H. et T. T.* (No. 1522); Madras, *Wight*; mont. Nilghiri, *Perrottet.*

F. Sebastianopolitanæ, Ldbg., quoad habitum et magnitudinem maxime affinis, sed perianthio decemplicato et foliis fere orbiculatis diversa. Huic pertinet "*F. hians*" quæ in insula Java reperta est.

214. F. squarrosa, *Nees ab E.*

Hab. In Himalaya australi, Nipal, *Wallich*; ad truncos *Lagerstrœmiæ reginæ,* Peradenia, Ceylon, *Gardner* (No. 1533).

215. F. ericoides, *Nees ab E.*

Hab. In Himalaya centrali et orientali temperata, Nipal, *Wallich*; Sikkim, alt. 5–10,000 ped., *J. D. H.* (No. 1535, 1543); montibus Khasia, alt. 5000 ped., *J. D. H. et T. T.*

216. F. æolotis, *Nees ab E.*

Hab. In Himalaya tropica et temperata, Kumaon, 6000 ped. *T. T.* (No. 1559); Sikkim, alt. 3–4000 ped., *J. D. H.* (No. 1524); Khasia, alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1545).

217*. F. glomerata, *L. et Ldbg.*

Hab. In montibus Nilgiri, *Perrottet.*

218. F. laciniosa, *Gottsche.*

Hab. In insula Ceylon, Peradenia, *Gardner* (No. 1426).

219. F. ASPERULA, sp. n. Caule procumbente pinnato, foliis divergentibus ovali-orbiculatis, lobulo brevi galeiformi, amphigastriis ovatis bifidis, sinu laciniisque acutis, perianthio compresso asperulo, dorso plicis nullis, ventre obtuse unicarinato, foliis involucralibus acutiusculis integerrimis.

Hab. In montibus Khasia, regione temperata, alt. 5–6000 ped., *J. D. H. et T. T.*

F. rugosæ affinis, diversa tamen cellulis interstitiis angustioribus, amphigastriis ovatis dentibus acutioribus, perianthio minus aspero et foliis involucralibus obtusioribus basi non coadunatis.

220. F. SUBINFLATA, sp. n. Caule procumbente brevi, foliis patentibus orbiculatis, lobulo magno obovato subinflato cauli parallelo, amphigastriis parvis ovali-oblongis ad tertiam partem excisis, perianthio obovato subcuneato compresso, dorso lævi, ventre bicarinato, foliis involucralibus rotundatis integerrimis.

Hab. In Peninsula, Madras, in cæspite *Parmeliæ leucomelæ, Fr.* (No. 1530).

Habitu *F. dilatatæ,* sed brevior et lobulo obovato, plicatione perianthii a confinibus satis diversa.

221. F. RETUSA, sp. n. Caule pinnato, foliis divergentibus ovato-orbiculatis, lobulo parvo galeato plus minusve evoluto lanceolatoque, amphigastriis orbiculatis obovatisve apice rotundatis retusisve, perianthio

oblongo-obtuso, dorso plano, ventre unicarinato laciniolis parvis sparse obtecto, foliis involucralibus ovatis acuminatis apice obtusis amphigastrioque involucrali subulate bidentato integerrimis.

Hab. In Himalaya occidentali temperata, Dwali, alt. 8500 ped., Kumaon, *Strachey et Winterbottom.*

F. Grevillianæ similis, sed perianthio sparse laciniolis obtecto diversa, a speciebus perianthiis asperis amphigastrio integerrimo recedens.

222. F. INFLEXA, sp. n. Caule procumbente pinnatim ramoso, foliis patentibus orbiculatis, lobulo oblongo compressulo apice caulem attingente, amphigastriis oblongo-rotundatis breviter bifidis, perianthio ovato-oblongo obtuso triquetro, foliis involucralibus acutiusculis integerrimis.

Hab. In Himalaya orientali temperata, Sikkim, ad truncos in pinetis, alt. 11,000 ped., *J. D. H.*

Statura *F. dilatatæ,* sed lobulus angustior apice cauli inflexus.

223. F. ACUTILOBA, sp. n. Caule procumbente subpinnatim ramoso, foliis patentibus cordato-ovatis obtusis, lobulo galeiformi decurvo basi extus spiniformi acuminato, amphigastriis ovatis breviter bifidis dentibus acuminatis, foliis involucralibus acuminatis integerrimis.

Hab. In montibus Nilgiri, *Perrottet.*

F. dilatata robustior, et apiculatione lobulorum *F. Hampeaneæ F. spiniferæque* affinis.

224. F. BREVIUSCULA, sp. n. Caule breviusculo vage ramoso, foliis patentibus ovatis obtusis, lobulo magno oblongo galeato compressulo a cauli soluto decurviusculo, amphigastriis ovalibus breviter bidentatis, perianthio compresso, dorso uni- ventre bicarinato, foliis involucralibus ovato-lanceolatis integerrimis basi cum amphigastrio elliptico coalitis.

Hab. In montibus Khasia, regione tropica et temperata, in cæspitibus *Parmeliæ Kamtschadalis* et *Parmeliæ perforatæ,* alt. 4000 ped., *J. D. H. et T. T.* (No. 1551).

F. acutiloba minor, lobulis amphigastriisque diversis.

225. F. RUGOSA, sp. n. Caule procumbente pinnato, foliis divergentibus oblongis apice rotundatis, lobulo galeiformi compresso decurvo, amphigastriis subrotundis breviter bifidis, perianthio obovato, dorso plano, ventre leviter unicarinato tota superficie laciniolis obtecto, foliis involucralibus ovatis acuminatis basi cum amphigastrio connatis.

Hab. In montibus Khasia, regione subtrop., alt. 4000 ped., *J. D. H. et T. T.*; in insula Ceylon ad Matale, *Gardner*; etiam e Cochin-China ad *Stictam asperam* a cl. Montagne missam fragmenta carpsi.

Habitus faciesque *F. spiniferæ,* Tayl.; lobulus autem basi truncatus perianthiumque *F. laciniosæ* et *F. pycnanthæ,* a quibus tamen forma directioneque foliorum diversa.

226. F. PHYSANTHA, sp. n. Caule procumbente pinnato, foliis divergentibus ovatis obtusis, lobulo parvo galeato decurvo evolutove, amphigastriis orbiculatis integris undulatis, perianthio magno ovato, inferne inflato lævi, apice truncato quinqueplicato, angulis subcrenatis, foliis involucralibus obtuse angulatis amphigastrio ovato bidentato.

Hab. In montibus Khasia, regione tropica, alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1553).

Statura *F. rugosæ* similis, colore habituque conveniens; perianthia vero monstrosa fere in omnibus speciminibus, in paucis tamen isomorpha.

227. F. Nepalensis, *L. et Ldbg.*

F. Grevillianæ, Taylor, et forsan *F. Hornschuchianæ*, Nees ab E., diagnosis ab amphigastrii forma præcipue desumpta, instabilis, nam in eodem ramo amphigastria vel integra vel retusa bidentataque inveniuntur.

Hab. In Himalaya orientali temperata, Sikkim, alt. 6–1000 ped., *J. D. H.* (No. 1536, 1542, 1521); in mont. Khasia regione subtrop., Nunklow, alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1547, 1550, 1555).

Forma amphigastriis præsertim integris:—

Hab. In Himalaya temperata, subtropica et alpina, Simla, alt. 7000 ped., *T. T.* (No. 1554); Sikkim, alt. 4–7000 ped. (No. 1557), 12–14,000 ped. (No. 1522, 1537); in montibus Khasia, regione temp., alt. 5–7000 ped., *J. D. H. et T. T.*; Assam, *Griffith*.

228. F. Thuilleri, *Nees ab E.*

Hab. Singapore, *Wallich*; in insula Ceylon, *Gardner*.

229. F. Ceylanica, *Nees ab E.*

Hab. In insula Ceylon, Matale, *Gardner*, *Wight*.

230. F. recurvata, *L. et L.*

Hab. Madras, *Wight*.

231. F. nodulosa, *Nees ab E.*

Hab. Madras, *Wight*.

232. F. EXPLANATA, sp. n. Caule bipinnato, ramis decurvis, foliis divergentibus oblongis apice rotundatis, lobulo parvo cylindrico replicato pendulo, amphigastriis cordato-ovatis bicuspidatis, foliis involucralibus argute dentatis.

Hab. In insula Ceylon, Pas-dum-Korle, *Gardner* (No. 1527).

F. Ceylanica minor, foliis siccitate parum incurvis, caulinis sæpe destructis. Species ambitu æquali foliorum ab affinibus distincta.

233. F. apiculata, *R. N. et B.*

Hab. In montibus Khasia, alt. 5000 ped., *J. D. H. et T. T.* (No. 1528); Assam, *Griffith*; in insula Ceylon ad Matale, *Gardner*.

234*. F. neurota, *Taylor*.

Hab. In Himalaya centrali ad Nipal, *Hb. Taylor*.

235. F. Hutchinsiæ, *Nees ab E.*; var. *β.*
Hab. In montibus Khasia, regione subtropica, alt. 4000 ped., *J. D. H. et T. T.* (No. 1548).

236. F. moniliata, *Nees ab E.*
Hab. In Himalaya orientali temperata, Sikkim, alt. 7000 ped., *J. D. H.* (No. 1531); in montibus Nilgiri, *Perrottet.*

237*. F. Tamarisci, *Nees ab E.*
Hab. In insula Ceylon, *Gardner.*

238. F. ANGUSTATA, sp. n. Caule gracili pinnato, foliis orbiculatis divergentibus, lobulo magno cylindrico cauli fere parallelo paululum declinatove, amphigastriis parvis bidentatis lateribus utrinque unidentatis, perianthio oblongo obtuso compresso dorso uni- ventre bicarinato, foliis involucralibus obtusis integerrimis.
Hab. In insula Ceylon, Peradenia ad arbores, *Gardner* (No. 1434, 1526).
Gracilis, statura *F. fragilifoliæ,* foliis vero non notatis et amphigastriis iis *F. reptantis* similibus, lobulo tamen cylindrico, nec galeato compresso.

239. F. EVOLUTA, sp. n. Caule bipinnato gracili, foliis divergentibus ovato-rotundatis apice obtuso subangulatove, lobulo parvo oblongo-cylindrico cauli incumbente, in caule primario sæpe evoluto, perianthio oblongo obtuso trigono, foliis involucralibus acutis integerrimis.
Hab. In Himalaya orientali temperata, alt. 7–8000 ped., *J. D. H.* (No. 1519).
F. apiculatæ similis, sed lobulo incumbente.

240. F. PENDULA, sp. n. Caule pinnato longiusculo gracili pendulo, foliis patentibus ovato-rotundis apice angulatis incurvis, lobulo parvo cylindrico cauli parallelo, amphigastriis parvis oblongis bifidis, perianthio oblongo obtuso triquetro, foliis involucralibus acuminatis acutis parce dentatis.
Hab. In insula Ceylon, *Gardner* (No. 1556).
A *F. Ternatensi,* quocum habitu convenit, foliis apice inflexis involucroque parce dentato differt.

§ II. FRONDOSÆ.

I. DIPLOMITRIÆ.

1. CALYCULARIA, genus novum.

Involucrum apicale et dorsale, polyphyllum. *Perianthium* cyathiforme. *Calyptra* libera. *Frondes* dichotomæ, costatæ, ventre squamosæ radiculosæ.

241. C. CRISPULA, sp. n.
Hab. In Himalaya orientali temperata, Sikkim, alt. 6000 ped., in solo humido, *J. D. H.* (No. 1679).
Frondes unciales dichotomæ, iterum atque iterum ex apice retuso inno-

vantes, innovationes obcordatas prodentes, marginibus integerrimis undulato-crispulis, dorso lævi, ventre utrinque ad costam squamis teneris lanceolatis obtecto radiculoso. *Involucrum* e squamis parvis teneris lacero-multifidis. *Perianthium* pro planta magnum, ore dentato-lacero. *Calyptra* parva, ad basin libera. *Capsula* globosa, irregulariter rumpens, brevissime pedicellata, vix e perianthio emergens sporis magnis echinulatis elateribus intermixtis repleta.—Genus a *Steetzia*, perianthio cyathiformi, involucro polyphyllo, et squamis ventralibus diversum.

2. Steetzia, *Lehm.*

242. S. decipiens, sp. n. Rhizomate repente ramoso, frondibus ambitu flabelliformibus stipitatis erectis 1- 2- aut 4-bifidis, marginibus serratis immarginatis, apicibus obtusis attenuatisve, involucro subcyathiformi dentato, perianthio elongato cylindrico ore dentato, calyptra usque ad medium perianthii coadunata.

Hab. In insula Ceylon, Horton Plains, *Gardner.*

Frons uncialis, *Symphognam hymenophyllam* simulans, divisionibus tamen angustioribus et cellulis minoribus firmioribus.

243. S. Lyellii, *Lehm.* (Systasis, *Griff. Notulæ*, p. 316, *Icon.* pl. 75 A.)

Hab. In India orientali, *Hb. Dickson*; in montibus Khasia regione subtropica, alt. 3–5000 ped., *J. D. H. et T. T.* (No. 1636); in insula Ceylon, *Gardner.*

244. S. crispata, *Nees ab E.*

Hab. In montibus Nilgiri, *Perrottet.*

245. S. ambigua, sp. n. Fronde substipitata uni- bifurcata gracili, marginibus dentatis, textura firmiuscula pellucida.

Hab. In montibus Khasia, regione tropica, alt. 2–4000 ped., *J. D. H. et T. T.* (No. 1637); Assam, *Griffith.*

S. Lyellii duplo minor, cellulis pellucidioribus.

3. Pellia, *Raddi.*

246. P. calycina, *Taylor.*

Hab. In Tibetia occidentali temperata, Tarkiti, Indus-valley, alt. 8000 ped., *T. T.* (No. 1674).

247. P. epiphylla, *Nees ab E.*

Hab. In Himalaya centrali ad Nipal, *Wallich.*

4. Metzgeria, *Raddi.*

248. M. furcata, *Nees ab E.*

Hab. In Himalaya temperata et alpina, Kumaon, *Strachey et Winterbottom*; Sikkim, alt. 10–12,000 ped., *J. D. H.* (No. 1631, 1634).

249. M. pubescens, *Raddi.*
Hab. In Himalaya boreali-occidentali temperata, Simla, alt. 8–10,000 ped., *T. T.* (No. 1632).

5. Sarcomitrium, *Corda.*

250. S. multifidum, *Mitten.*
Hab. In Himalaya orientali temperata, Sikkim, alt. 5–10,000 ped., *J. D. H.* (No. 1633, 1635).

251*. S. pingue, *Mitten.*
Hab. In Himalaya centrali ad Nipal, *Wallich* ?

II. Synhymeniæ.

1. Synhymenium, *Griffith.*

252. S. aureonitens, *Griff. Notulæ,* p. 344, *Icon. Plant. Asiat.* pl. 69 D. f. 2.
Hab. In Himalaya orientali temperata, Sikkim, alt. 4–7000 ped., *J. D. H.* (No. 1697); in montibus Khasia, in rupibus arenosis ad margines torrentum, *Griffith*; Pegu ad Rangoon, *M'Clelland.*
Plantula curiosissima, cujus, brevi tempore, tabulam alteram in lucem proferre spero.

III. Targioniæ.

1. Targionia, *Micheli.*

253. T. Michelii, *Corda.*
Hab. In Himalaya boreali-occidentali temperata, Simla, alt. 7000 ped., *T. T.* (No. 1682); in montibus Khasia, in ripis Mumbree et in rupibus arenosis Mahadeb, alt. 2000 ped., *Griffith.*

IV. Lunularieæ.

1. Plagiochasma, *L. et Ldbg.*

254. P. cordatum, *L. et Ldbg.* (Antrocephalus polycarpon *et* A. megacarpon, *Griff. Notulæ*, pp. 337–338, *Icon.* pl. 65. f. 1 et 2?)
Hab. In Himalaya centrali, Nipal, *Wallich*; in montibus Khasia, regione temperata, alt. 4000 ped., *J. D. H. et T. T.* (No. 1683).

255. P. appendiculatum, *L. et Ldbg.*
Hab. In Himalaya occidentali tropica, Deyra Dhoon, *Wallich*; Assam, *Simon.*

256*. P. Colsmannianum, *L. et Gottsche.*
Hab. In Himalaya centrali, Nipal, *Wallich.* India orientalis, *Wight.*

257*. P. paradoxum, *Griff. Notulæ*, p. 330, *Icon.* pl. 69 E.
Hab. In montibus Khasia, in rupibus calcareis Moosmai, *Griffith.*

258*. P. (Antrocephalus) pedicellatum, *Griff. Notulæ,* p. 331, *Icon.* pl. 68. f. 2.

Hab. Assam, *Griffith.*

V. Jecorariæ.

1. Marchantia, *Linn.*

259. M. polymorpha, *Linn.*

Hab. In Himalaya et Tibetia occidentali temperata, Ladall et Nubra alt. 11–14,000 ped., *T. T.* (No. 1668); Jamu, alt. 6000 ped., *T. T.* (No. 1662); Sikkim, alt. 4–8000 ped., *J. D. H.* (No. 1645, 1656, 1657, 1649, 1642, 1659, 1652, 1646, 1662).

260. M. nitida, *L. et Ldbg.*

Hab. In Himalaya boreali-occident., *Royle*; temperata, Kumaon, alt. 6000 ped., *T. T.* (No. 1676). Sikkim, alt. 8000 ped., *J. D. H.* (No. 1648). Nipal, *Wallich.* In mont. Nilgiri, *Perrottet.*

261. M. Nepalensis, *L. et Ldbg.*

Hab. In Himalaya centrali, Nepal, *Wallich, Buchanan, Hamilton.*

262. M. linearis, *L. et Ldbg.*

Hab. In Himalaya subtropica et temperata, Nipal, *Wallich.* Sikkim, alt. 4–7000 ped., *J. D. H.* (No. 1658, 1638, 1647, 1653). In montibus Khasia, alt. 1–4000 ped. (No. 1672, 1675). In insula Ceylon ad ripas fluviorum, *Gardner* (No. 1670).

263. M. squamosa, *Raddi.*

Hab. In India orientali, *Wallich.*

264. M. Assamica, *Griff. Notulæ,* p. 327, *Icon.* pl. 69 B.

Hab. Ad ripas fluminis Burrampooter et Koondil, *Griffith.*

265. M. subintegra, sp. n. Fronde lineari-dichotoma subtus purpurea, receptaculo fœmineo hemisphærico subintegro obtuse lobatove, subtus barbato, receptaculo masculo pedato lobis 5–7 brevibus.

Hab. In Himalaya orientali temperata, Bhotan, *Booth.* Sikkim, alt. 5–8000 ped., *J. D. H.* (No. 1639, 1640, 1643, 1644*b* [planta ♂], 1654).

A *M. Assamica* receptaculo fœmineo superne grosse tuberculoso et inferne barbato diversa esse videtur.

2. Dumortiera, *Nees ab E.*

266. D. hirsuta, *Nees ab E.*

Hab. In montibus Khasia, reg. subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1671); in montibus Nilgiri, *M'Ivor.* In insula Ceylon, *Gardner.*

267. D. denudata, sp. n. Receptaculo fœmineo glabro polycarpo

subtus brevissime barbato, involucris glabris, fronde lævi dichotoma glabra, poris parcis distinctis.

Hab. In Himalaya orientali temperata, alt. 7000 ped., *J. D. H.* (No. 1681).

A congeneribus fronde lævi, pedunculo gracili, et receptaculo tenero glabro distincta.

268. D. Nepalensis, *Nees ab E.*

Hab. In Himalaya orientali temperata et subtropica, alt. 5–8000 ped., *J. D. H.* (No. 1664, 1665); in montibus Khasia, alt. 3–5000 ped., *J. D. H. et T. T.* (No. 1673).

3. Fegatella, *Raddi.*

269. F. conica, *Corda.*

Hab. In Himalaya orientali temperata, alt. 7000 ped. (No. 1651). In Tibetia occidentali, Ladak et Nubra, alt. 9–11,000 ped., *T. T.* (No. 1661*b*).

4. Grimaldia, *Raddi.*

270. G. dichotoma, *Raddi.*

Hab. In Himalaya occidentali temperata, Jamu, alt. 8000 ped., *T. T.* (No. 1680); Simla, alt. 7000 ped., *T. T.* (No. 1669). In Tibetia occidentali, Nubra, alt. 11,000 ped. *T. T.* (No. 1697).

271. G. barbifrons, *Bisch.*

Hab. In Himalaya centrali, Nipal, *Fischer in Hb. Hook.*

5. Fimbriaria, *Nees ab E.*

272. F. Nepalensis, *Taylor.*

Hab. In Himalaya centrali, Nipal, *Wallich.*

273. F. elegans, *Spreng.*, var. γ.

Hab. In Himalaya centrali, Nipal, *Wallich.*

274. F. Wallichiana, *L. et Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich.*

275. F. sanguinea, *L. et Ldbg.*

Hab. In India orientali, *Wallich.*

276. F. Khasiana. (Octoskepos, *Griff. Notulæ*, p. 343, *Icon.* pl. 69 D. f. 1.)

Hab. In Himalaya occidentali, Kumaon, *Strachey et Winterbottom*; in montibus Khasia subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1677); infra rupem in pinetis Moflong, *Griffith.*

277. F. viridis, *L. et Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich.*

278. F. leptophylla, *Mont.*

Hab. In montibus Nilgiri, *Perrottet.* Montibus Khasia subtrop., alt. 4000 ped., *J. D. H. et T. T.* (No. 1678).

6. Reboulia, *Nees ab E.*

279. R. hemisphærica, *Raddi.*

Hab. In Himalaya orientali temperata, Sikkim, alt. 7–10,000 ped., *J. D. H.* (No. 1660, 1666). In Tibetia occidentali, Ladak, Nubra et Balti, alt. 3–12,000 ped. *T. T.* (No. 1667, 1663, 1661). Himalaya boreali-occidentalis, *Royle.* India orientalis, *Wight.*

280*. R. graminosa, *Griff. Notulæ*, p. 336, *Icon.* pl. 69. f. 1.

Hab. Affghanistan, ad aggeres umbrosos, Otipore, *Griffith.*

6. Askepos, *Griffith.*

281*. A. brevipes, *Griff. Notulæ*, p. 340, *Icon.* pl. 75 B. f. 2.

Hab. In sylvis umbrosis Tingrei agri Muttack, *Griffith.*

8. Monosolenium, *Griffith.*

282*. M. tenerum, *Griff. Notulæ*, p. 341, *Icon.* pl. 75 B. f. 1.

Hab. In agris arenosis prope Suddya regionis Assamicæ superioris, in sylvis Tingrei, *Griffith.*

VI. Anthocerotæ.

1. Anthoceros, *Micheli.*

283. A. glandulosus, *L. et Ldbg.*

Hab. In Himalaya orientali temperata, Bhotan, *Booth*; Sikkim, alt. 7000 ped., *J. D. H.* (No. 1689). In montibus Khasia, alt. 4000 ped., *J. D. H. et T. T.* (No. 1685).

284. A. punctatus, *Linn.*

Hab. In montibus Khasia, regione temperata, alt. 5–6000 ped., *J. D. H. et T. T.* (No. 1687).

VII. Riccieæ.

1. Riccia, *Micheli.*

285*. R. discolor, *L. et Ldbg.*

Hab. In Himalaya centrali, Nipal, *Wallich.*

286. R. crystallina, *Linn.*

Hab. In prov. Bengaliæ interiore, in alveo fluvii Soane, *J. D. H.* (No. 1694).

287. R. ciliata, *Hoffm.*

Hab. Cum priore, *J. D. H.* (No. 1695).

Specimina hujus et præcedentis speciei non omni dubio soluta, pagina superiore ut plurimum insectis consumpta.

288. R. crispatula, sp. n. Fronde solida dichotoma, laciniis linearibus canaliculatis subtus purpureis, margine ob prominentiam plicarum lamelliferarum crispatulo, capsulis seriatis.

Hab. In insula Ceylon, Matale, *Gardner.*

R. nigrella parum major, marginibus minus involutis et textura laxiore.

289*. **R. squamata,** *Nees ab E.*
Hab. In India orientali, *Wight.*

290. **R. fluitans,** *Linn.*
Hab. In Himalaya centrali et occidentali, Nipal, *Wallich*; Kumaon, *Strachey et Winterbottom*; in montibus Nilgiriensibus, *Wight, Schmidt.*

Præcursores ad Floram Indicam.

By J. D. Hooker, Esq., M.D., F.R.S. & L.S., and T. Thomson, M.D., F.R.S. & L.S.

[Read June 21st, 1860.]

CRUCIFERÆ.

In the following sketch of the Indian *Cruciferæ*, the new arrangement adopted in the forthcoming 'Genera Plantarum,' by Messrs. Bentham and J. D. Hooker, has been followed. The majority of the species were described and carefully analysed several years ago, with a view to their earlier publication, in accordance with DeCandolle's classification of the Order; but it was found that they contained so many oriental forms unknown to that great systematist, and which materially affected the value of his divisions, that all were laid aside till an opportunity should occur of revising the whole Order. This has since occurred, and has led to the re-examination of every Indian species by Dr. Hooker, who is the author of the arrangement adopted in the Clavis generum now proposed for the Indian species.

CLAVIS GENERUM.

Series A. *Siliqua* inarticulata, per totam longitudinem dehiscens. *Valvæ* intus continuæ, turgidæ v. septo parallele compressæ.

Excepta. Siliqua indehiscens in *Leptaleo,* interdum in *Alloceratio,* et apicem versus in *Brassicis* quibusdam. Valvæ intus subseptatæ in *Notoceras,* etc.

Tribus I. Arabideæ. *Siliqua* angusta, elongata. *Semina* sæpissime 1-seriata. *Cotyledones* accumbentes (*ignotæ in* Loxostemone).

Excepta. Siliqua interdum brevis in *Nasturtio, Parrya* et *Notocerate.* Semina 2-seriata in subgenere *Turritis* (*Arabidis*) et *Parryis* variis.—Vide *Farsetia* et *Draba* in Tribu II.

* Valvæ *exappendiculatæ.* Sepala *erecta, elongata.* Stigmata *erecta, connata v. secus stylum decurrentia.*

1. MATHIOLA. *Siliqua* elongata, polysperma; stylo sæpe utrinque incrassato v. cornigero.—*Herbæ* v. *suffruticuli* ramosi, incano-tomentosi.

2. ALLOCERATIUM. *Siliquæ* biformes, superiores *Mathiolæ*, sed stylo simplici; inferiores indehiscentes.—*Herba* parva, habitu *Mathiolæ*, pilosa; foliis linearibus; petalis sepalisque angustis.

3. PARRYA. *Siliqua* et *stigmata* varia.—*Herbæ* perennes, alpinæ, cæspitosæ, scapigeræ; floribus sæpe magnis et radicibus crassis.

** Valvæ *exappendiculatæ*. Stigma *indivisum v. breviter bilobum* (vide *Parrya* in priore).

4. CHEIRANTHUS. *Sepala* erecta, lateralia basi saccata.—*Herbæ* v. *suffruticuli* foliosi, appresse cani v. tomentosi; floribus majusculis.

5. ATELANTHERA. *Stamina* longiora antheris 1-locularibus.—*Herba* tenuis, perpusilla, annua, setulis appressis; floribus parvis.

6. NASTURTIUM. *Sepala* patula. *Petala* parva. *Siliqua* varia, tumida, teretiuscula; seminibus minimis, 2-seriatis.—*Herbæ* ramosæ, foliosæ; foliis sæpissime pinnatisectis; floribus parvis, flavis, rarius albis.

7. BARBAREA. *Siliqua* tetragono-anceps; seminibus 1-seriatis, oblongis.—*Herbæ* erectæ, caule angulato; foliis variis; floribus flavis.

8. ARABIS. *Siliqua* anguste lineari-elongata; valvis planiusculis, nervosis; seminibus compressis, 1-seriatis (rarissime 2-seriatis).—*Herbæ* sæpe canæ, rarius cæspitosæ, foliosæ; foliis radicalibus sæpissime rosulatis spathulatis, caulinis integris; floribus albis, rarius roseis.

9. CARDAMINE. *Siliqua Arabidis*, sed sæpius utrinque acuminata, valvis subenervibus elasticis; seminibus 1-seriatis. *Stamina* simplicia.—*Herbæ* sæpe glaberrimæ, foliosæ; foliis variis; floribus albis purpureisve.

?10. LOXOSTEMON. *Siliqua Cardamines*. *Stamina* longiora, superne geniculatim divaricata.—*Herba* debilis, glaberrima; foliis paucis, pinnatisectis, paucijugis; floribus paucis, violaceis.

*** Valvæ *cornutæ v. appendiculatæ*.

11. NOTOCERAS. *Siliqua* brevis, valvis intus septatis.—*Herba* ramosa, foliosa, cana; foliis integris; floribus parvis, flavis.

Tribus II. ALYSSINEÆ. *Siliqua* brevis, lata. *Semina* sæpissime 2-seriata. *Cotyledones* accumbentes.

Excepta. Siliqua elongata et semina 1-seriata interdum in *Farsetia* et *Draba* (vide *Parrya* in *Arabideis*).

* Siliqua 2-*locularis, polysperma, et* semina *(sæpe alata) compressissima.*

12. FARSETIA. *Siliqua* sessilis, forma varia; seminibus 1-seriatis, alatis.—*Suffruticuli* v. *herbæ* tenues, ramosæ, canæ; foliis parvis, alternis, linearibus, integris.

** Siliqua 1–2-*locularis,* 2- *polysperma; valvis sæpius turgidis;* seminibus *biseriatis, rarissime alatis.* (Semina *interdum* 1-*seriata in* Cochlearia.)

13. ALYSSUM. *Sepala* brevia, patula, æqualia. *Stamina* sæpe appendiculata. *Siliqua* compressa, brevis, sæpius orbicularis; seminibus loculis 2 oppositis, rarius pluris.—*Herbæ* sæpe parvæ, canæ, rigidulæ; foliis alternis, integris; floribus albis v. flavis.

14. DRABA. *Sepala* brevia, patula, æqualia. *Petala* sæpius brevia. *Stamina* exappendiculata. *Siliqua* oblonga v. elliptica, rarius linearis; seminibus 2-seriatis.—*Herbæ* sæpissime humiles et scapigeræ, ramosæ v. cæspitosæ, canæ v. stellatim tomentosæ; floribus albis v. flavis.

15. COCHLEARIA. *Sepala* brevia, patula, æqualia. *Siliqua* brevis, forma varia, valvis sæpe grosse venosis.—*Herbæ* glabræ, foliosæ vel scapigeræ, habitu variæ; floribus sæpissime albis.

Tribus III. SISYMBRIEÆ. *Siliqua* angusta, elongata. *Semina* sæpissime 1-seriata. *Cotyledones* incumbentes, rectæ (*in* Lepidostemone *ignotæ*).

Excepta. Siliqua interdum brevis in *Malcolmia.* Semina biseriata in *Eutrema.*

* Valvæ *apice bicornutæ.*

16. TETRACME. *Siliqua* brevis, sub-4-gona, curva, 4-cornuta. —*Herbæ* pubescentes; foliis oblongis; floribus parvis, albis; siliquis apice arcuato-deflexis.

** Valvæ *simplices.* Sepala *elongata, erecta.* Stigmata *erecta, libera v. in conum connata.*

17. MALCOLMIA. *Siliqua* subsessilis, rigida, teretiuscula.—*Herbæ* ramosæ, sæpe prostratæ, pilis simplicibus furcatisve;

foliis alternis, integris v. pinnatifidis; floribus albis v. purpureis.

*** Valvæ *simplices.* Stigma *capitatum, emarginatum v. breviter bilobum.* Cotyledones *rectæ.*

18. LEPIDOSTEMON. *Stamina* libera, omnia squama lata appendiculata.—*Herba* parvula, erecta, pubescenti-tomentosa, foliosissima; foliis dentatis; floribus flavis, subcorymbosis, longe pedunculatis.

19. SISYMBRIUM. *Siliqua* linearis, teres v. compressa; valvis 1–3-nerviis; seminibus sæpissime 1-seriatis.—*Herbæ* annuæ et sæpe elatæ, nunquam setulis appressis; foliis sæpissime runcinato-pinnatilobis; floribus albis v. flavis, sæpe gracile pedicellatis.

20. EUTREMA. *Siliqua* linearis v. lineari-oblonga, teres; valvis 1-costatis; stigmate parvo; seminibus sæpissime 2-seriatis.—*Herbæ* perennes, glaberrimæ, foliosæ; foliis indivisis, integerrimis v. serratis, radicalibus sæpius petiolatis.

21. ERYSIMUM. *Sepala* erecta, lateralia basi saccata. *Siliqua* elongata, compressa, tetragona v. teretiuscula.—*Herbæ* elatæ v. rarius humiles, foliosæ, caule sæpe angulato, pilis bipartitis appressis canæ; foliis linearibus indivisis; floribus sæpissime flavis.

22. CHRISTOLEA. *Siliqua* lineari-lanceolata, compressa; valvis planis; seminibus paucis.—*Herba* ramosa, crassiuscula, glabriuscula v. cana, foliosa; foliis integris v. sinuato-dentatis.

Tribus IV. CAMELINEÆ. *Siliqua* brevis v. elongata. *Semina* biseriata. *Cotyledones* incumbentes.

Exceptum. Semina interdum 1-seriata in *Braya.*

23. LEPTALEUM. *Sepala* et *petala* linearia. *Siliqua* sessilis, indehiscens! 1-locularis.—*Herba* parvula; foliis filiformibus.

24. BRAYA. *Siliqua* varia; seminibus paucis, majusculis, 1–2-seriatis.—*Herbæ* pusillæ, cæspitosæ, scapigeræ; foliis rosulatis, linearibus spathulatisve; floribus corymbosis.

Tribus V. BRASSICEÆ. *Siliqua* brevis v. elongata; septo valvis non lateraliter compressis æquilato. *Cotyledones* longitudinaliter plicatæ.

25. BRASSICA. *Siliqua* elongata, stigmate terminali, truncato v. bilobo.—*Herbæ* plerumque glabriusculæ, habitu et duratione variæ; floribus sæpissime flavis.

26. Moricandia. *Siliqua* elongata; stigmatibus in conum erectum connatis.—*Herbæ* basi frutescentes, glaucæ; foliis integris amplexicaulibus v. pinnatisectis; floribus magnis, purpureis.

Series B. *Siliqua* inarticulata, dehiscens, 2-locularis, brevis, didyma, orbicularis, obovata v. oblonga. *Valvæ* septo angustissimo contrarie compressæ.

Excepta. Siliqua indehiscens in *Megacarpæa*; turgida, vix compressa in *Capsella elliptica.*

Tribus VI. Lepidineæ. *Cotyledones* incumbentes.

27. Capsella. *Siliqua* brevis, polysperma, oblonga obcordata v. elliptica; valvis navicularibus v. compresso-carinatis.—*Herbæ* habitu variæ; floribus albis.

28. Lepidium. *Siliqua* disperma; valvis carinatis v. dorso alatis.—*Herbæ* erectæ v. prostratæ, sæpe glabræ, habitu variæ.

29. Dilophia. *Siliqua* brevissima, 4-sperma; valvis dorso bicristatis.—*Herba* ramosa, foliosa, depressa; foliis linearibus.

30. Æthionema. *Siliqua* elliptico-oblonga, utrinque truncata; valvis late alatis. *Stamina* majora connata v. intus dente aucta.—*Herbæ* glaberrimæ, glaucæ; foliis integerrimis, basi cordatis; floribus confertis.

Tribus VII. Thlaspideæ. *Cotyledones* accumbentes.

31. Heldreichia. *Siliqua* orbicularis, dehiscens, 2-sperma, basi et apice integra.—*Herbæ* habitu *Umbelliferarum.*

32. Megacarpæa. *Siliqua* orbicularis, indehiscens, 2-sperma.—*Herbæ* magnæ, foliis runcinato-pinnatifidis; floribus albis, interdum polyandris.

33. Thlaspi. *Siliqua* apice emarginata, rarius acuta, loculis 2- polyspermis. *Stamina* exappendiculata.—*Herbæ* annuæ, sæpissime glabræ, habitu variæ; foliis caulinis sæpissime auriculatis; floribus albis v. violaceis.

34. Iberidella. *Siliqua* elliptica v. oblonga, acuta, stylo gracili; valvis apteris carinatis 2–6-spermis. *Stamina* exappendiculata.—*Herbæ* v. *suffruticuli* glaucæ; foliis integris, caulinis cordato-sagittatis.

35. Hutchinsia. *Siliqua* oblonga v. elliptica; valvis carinatis, apteris, 2- polyspermis.—*Herbæ* pusillæ, tenues, scapigeræ; foliis pinnatilobatis.

Series C. *Siliqua* inarticulata, indehiscens, evalvis, sæpissime brevis; vel 1-locularis 1-sperma, vel 2–4-locularis; loculis per paria parallelis, 1-spermis.

Tribus VIII. Patideæ. *Siliqua* 1-locularis, 1-sperma.

* Siliqua *alata*; cotyledonibus *accumbentibus*.

36. Clypeola. *Siliqua* parva, orbicularis. *Stamina* basi appendiculata.—*Herbæ* annuæ, tenellæ; floribus minimis.

37. Moriera. *Siliqua* oblonga v. obcordata; disco crasso, crustaceo.—*Fruticuli* interdum aphylli v. foliosi; floribus parvis.

** Siliqua *alata*; cotyledonibus *incumbentibus*.

38. Isatis. *Siliqua* magna, orbiculata oblonga v. linearis; disco corneo v. osseo; alis incrassatis.—*Herbæ* glaucæ, sæpissime elatæ, ramosæ.

39. Tauscheria. *Siliqua* ovata, cymbiformis, marginibus involutis, stylo acuminata.—*Herba* annua, glauca; foliis integerrimis, caulinis sagittatis; floribus parvis, flavis.

40. Dipterygium. *Siliqua* parva, oblonga, crustacea, tenuiter alata.—*Suffruticulus* glandulosus, virgatus, ramosissimus; foliis sparsis, parvis.

*** Siliqua *non alata*.

41. Neslia. *Siliqua* parva, subglobosa, tenuiter crustacea, reticulata, stylo subulata.—*Herba* pilosa, pilis furcatis; foliis caulinis sagittatis.

Tribus IX. Buniadeæ. *Siliqua* 2–4-locularis.

42. Octoceras. *Siliqua* brevissima, 2-locularis; angulis 4, crassis, spinosis.—*Herbæ* parvulæ.

43. Euclidium. *Siliqua* oblique ovato-globosa, rostro oblique subulato, 2-locularis.—*Herbæ* ramosæ v. simpliciusculæ; foliis alternis; rostro siliquæ deciduo v. persistente.

44. Pyramidium. *Siliqua* pyramidata, rostrata, basi utrinque cornuta, 4-locularis.—*Herba* tomentosa, annua; sepalis petalisque angustissimis.

SERIES D. *Siliqua* transverse articulata, brevis v. elongata; articulis indehiscentibus v. inferiore bivalvi, interdum pedicelliformi.

Tribus X. CAKILINEÆ.

45. CRAMBE. *Articulus* inferior pedicelliformis, indehiscens; superior globosus, 1-locularis; stigmate sessili; ovulo e funiculo basilari pendulo.—*Herbæ* crassiusculæ; foliis petiolatis.

SERIES E. *Siliqua* inarticulata, indehiscens, elongata, teres v. moniliformis; v. 1-locularis polysperma, v. multilocellaris locellis 1–2-seriatis 1-spermis (vide *Leptaleum*, in Tribu IV.).

Tribus XI. RAPHANEÆ.

46. RAPHANUS. *Siliqua* teres v. moniliformis, intus cava v. isthmis spongiosis septata; seminibus globosis.—*Herbæ* annuæ v. biennes, ramosæ; foliis inferioribus lyratis; floribus majusculis, sæpe versicoloribus.

47. GOLDBACHIA. *Siliqua* breviuscula, curva, tetragona, stylo lato; locellis 2–3, isthmis constrictis.—*Herba* glabra, glauca, erecta; foliis caulinis basi auriculatis; floribus parvis, violaceis.

48. CHORISPORA. *Siliqua* teres, curva; multilocellata; locellis sæpe ab replo secedentibus; stylo elongato.—*Herbæ* perennes, foliosæ, sæpe depressæ.

1. MATHIOLA, *L.*

1. M. ODORATISSIMA (*Br. Hort. Kew*, ed. 2, iv. 120). Cano-tomentosa, foliis obovatis lanceolatisve sinuato-lobatis pinnatifidisve, petalis lineari-elongatis, siliquis erecto-patentibus longe linearibus, stigmate parvo, stylo simplici, valvis crasse costatis pubescenti-tomentosis.—*DC. Prodr.* i. 134; *Sims, Bot. Mag.* 1711; *Led. Fl. Ross.* i. 109.

Hab. Affghanistan! *Griffith*; Beluchistan, ad portum Rodbahan! *Stocks*; in Tibetia occidentali alt. 10000–12000 ped.! *T. T.*; Hasora! *Winterbottom*. (fl. Jul.) (v.v.)

Distr. Tauria, Caucasus.

Radix lignosa, sæpe multiceps. *Caules* ascendentes v. erecti, 1–2-pedales, simplices v. ramosi, stricti. *Folia* 1–4" longa, petiolata, forma varia et varie lobata, interdum integra, rarius lyrato-pinnatifida. *Racemi* laxiflori. *Flores* breve pedicellati. *Sepala* erecta, stellatim pubescentia, linearia, obtusa, medio herbacea, membranaceo-marginata. *Petala* pollicaria, sepalis duplo longiora, ungue erecto angusto, lamina lineari-oblonga v. ligulata, undulata, interdum torta, venosa,

emarginata. *Stamina* sepalis æquilonga; antheris linearibus, stramineis. *Ovarium* lineare; stigmate subcapitato. *Siliqua* longitudine varia, 2–4″, breve crasse pedicellata, recta v. lente curva. *Valvæ* $\frac{1}{8}$″ latæ, rigidæ, planiusculæ. *Replum* tenue. *Septum* crassiusculum, 2-nerve, nervis crassis flexuosis. *Semina* numerosa, septo æquilata, valde compressa, late membranaceo-alata, testa fusca.

Our specimens include *M. fragrans*, Bunge, which were rightly referred by DeCandolle to this species, though again separated by Ledebour.

There are several other species of *Mathiola* in Griffith's Affghan collections, but in much too imperfect a state for determination; one of these, having narrower pods than *M. odoratissima*, resembles very closely the *M. Arabica*, Boiss.; a second has much broader pods, and shorter, more thickened stigmata.

M. tristis and *M. incana* are cultivated in Northern India.

2. ALLOCERATIUM, *H. f. & T.*

1. A. strictum, *H. f. & T.* (Chorispora stricta, *DC.* Mathiola Fischeri, *Bernhardi.*)

Hab. Affghanistan ad portum Kuchlak! exempl. solitarium fructiferum, *Griffith.*

Distr. Regio Caspica! et Soongaria!

Variat insigniter longitudine styli.

3. PARRYA, *Br.*

1. P. EXSCAPA (*Meyer in Led. Fl. Alt.* iii. 28) (var. seminibus alatis). Glabra v. puberula, foliis spathulatis obtusis serratis v. integerrimis scapos 1-floros excedentibus, seminibus alatis 1–2-seriatis, stigmate sessili obtuso, siliquis brevibus v. elongatis pendulis scapos excedentibus.

Hab. In Tibetiæ occidentalis prov. Nubra, etc., alpina, alt. 15000–18000 ped.! *H. Strachey, T. Thomson.* (fl. Jul.–Sept.) (v.v.)

Distr. Mont. Altai.

Except in the winged seed, we can find no difference whatever between this plant and the *P. exscapa*, a native of the Altai.

2. P. MACROCARPA (*Br. in Parry, Voy. App.* p. 270). Hispidula v glabrata, foliis elongato-lanceolatis integerrimis remote dentatis v. basin versus pinnatifidis, scapis rigidis, floribus corymbosis, siliquis erectis exacte linearibus acutis, seminibus 1-seriatis late alatis, stigmate capitato, funiculis basi septo adnatis.

Hesperis Kunawarensis, *Royl. Herb.*

Hab. Affghanistan! alt. 12000 ped., *Griffith*; in Tibetia occidentali alpina, prov. Gugi, alt. 15500 ped.! *Str. & Wint.*; Nubra et Ladak, alt. 16000–18000 ped.! *T. T.*; Piti et Kunawar! *Jacquemont, Lance.* (fl. Jun.–Sept.) (v.v.)

Distr. Europa! America! et Asia! arctica, mont. Baikal! et Dahuria.

Exemplaria Griffithiana et Jacquemontiana cum arcticis Americanis exacte congruunt, nisi stylo breviore; in Thomsonianis siliquæ longiores et strictiores evadunt.

3. P. PLATYCARPA (*H. f. & T.*). Rhizomate crasso superne reliquiis spongiosis petiolorum operto, foliis petiolatis, petiolis basi longe dilatatis vaginantibus, lamina subcoriacea obtusa v. acuta integerrima glaberrima v. pilosula, scapis brevibus crassis 1–3-foliatis pilosis, racemo paucifloro, floribus maximis, sepalis basi saccatis, siliquis maximis ovatis valvis chartaceis convexis medio costatis et reticulatim venosis.

Hab. In Himalaya orientali alpina, Sikkim regionibus interioribus, alt. 16,000–17,000 ped.! *J. D. H.* (fl. Jun.) (v.v.)

Rhizoma crass. digiti. *Folia* pollicaria et ultra, coriacea, plana, vagina petioli suberosi persistente pallida. *Scapi* folia vix superantes, 4–6-flori. *Sepala* glabra, $\frac{1}{5}''$ longa. *Petala* ignota. *Siliquæ* ovatæ v. oblongæ, $\frac{3}{4}$–$1\frac{1}{4}''$ longæ, in stylum brevem rectum crassum apice bidentatum angustatæ. *Valvæ* pilosulæ, marginibus incrassatis, costa medio valida nervisque lateralibus rotundatis prominulis. *Semina* pauca orbicularia, compressa, non alata, funiculis brevissimis.

4. P. LANUGINOSA (*H. f. & T.*). Dense appresse lanuginosa, foliis spathulatis sinuato-dentatis, scapis pedicellis racemosis calycibusque patentim lanuginosis, floribus parvis, siliquis ovato-lanceolatis acuminatis undulatis, septo angustissimo v. nullo! seminibus elliptico-ovatis compressis non alatis.

Hab. In Tibetia occidentali ad Lanjar prov. Gugi, alt. 17500 ped.! *Str. & Wint.*

Radix multiceps. *Folia* rosulata, alba, 1″ long. *Sepala* late ovata. *Petala* late spathulata, crispato-undulata. *Antheræ* lineares. *Siliquæ* $\frac{3}{4}''$ longæ, $\frac{1}{3}''$ latæ, basi rotundatæ, septo replum marginante. *Semina* pauca, parva.

5. P. pinnatifida, *Kar. & Kir. En. Pl. Soong.* 69; *Led. Fl. Ross.* i. 751.

Hab. In Affghanistan arenosis ad basin Hajee-gul, *Griffith* (No. 1056, *Gr. Journal*) (exemplaria mala).

Distr. Soongaria.

4. CHEIRANTHUS, *L.*

1. C. STOCKSIANUS (*Boiss. Diagn. Ser.* ii. No. I. p. 19). Caulibus erectis robustis ramosis glaberrimis, foliis spathulatis lineari-lanceolatisve obtusis integerrimis v. paucidentatis minute stellatim pubescentibus, sepalis puberulis, petalis anguste spathulatis, ovario puberulo stylo subelongato, stigmatis lobis brevibus.

Hab. In Beluchistan superiore, alt. 5000 ped., *Stocks*! (fl. April, May); Affghanistan, *Griffith*!

Radix annua? fusiformis, lignosa. *Caules* plurimi, spithamæi v. bipedales, plerique ramosi, nitidi. *Folia* crassiuscula, sicca scaberula, 1–2″ longa, latitudine valde varia. *Racemi* elongati. *Flores* breve pedicellati, flavi. *Sepala* $\frac{1}{3}$″ longa, linearia, obtusa, membranaceo-marginata. *Petala* sepalis bis longiora. *Fructus* non visus.

Boissier suggests the probability of this being an *Erysimum*, a point we cannot determine: he also compares it with his *C. crassicaulis*, a South Persian species, to which, judging from his description, we should probably have referred it, but in the absence of authentic specimens we refrain from doing so.

2. C. Himalaïcus (*Cambess. in Jacq. Voy. Bot.* p. 14, t. 13). Pusillus, multicaulis, totus molliter tomentosus vel lanuginosus, caulibus foliosis, foliis radicalibus spathulatis grosse lobatis dentatis integrisve, caulinis lineari-obovatis integerrimis, racemis brevibus, siliquis compressis, valvis planis tomentosis.

Hab. In Tibetia occidentali alpina, alt. 15000–17000 ped., Kunawar! *Jacquemont*; Gugi! *Str. & Wint.*! Piti! Ladak! Nubra! etc., *T. T.* (fl. Jul.) (v.v.)

Radix perennis, sæpius multiceps. *Caules* suberecti, 1–4-pollicares, foliosi. *Folia* radicalia interdum rosulata, late v. anguste spathulata v. linearia, integra sinuata lobata v. subpinnatifida. *Flores* capitati, violacei. *Sepala* ovato-oblonga, subæqualia, lateralia obscure saccata. *Petala* sepalis $\frac{1}{2}$ longiora, obovato-spathulata et retusa v. obcordato-spathulata. *Filamenta* crassiuscula. *Antheræ* breves, stramineæ. *Ovarium* cylindraceum, obtusum. *Siliquæ* $\frac{2}{3}$–$1\frac{1}{2}$″, strictæ, suberectæ, compressæ, stellatim tomentosæ, stylo valido terminatæ; stigmate brevi, bilobo; valvis planiusculis, venosis, medio costatis, marginibus crassis. *Septum* membranaceum, enerve. *Semina* numerosa, parva, sub-2-seriata, septo dimidio angustiora, ovato-oblonga, turgida; testa minute punctulata; funiculis brevibus.

This curious little species differs in habit from its congeners, and has a short calyx that is hardly saccate at the base.

3. C. Griffithii (*H. f. & T.*). Pumilus, caule brevissimo ramoso, foliis confertis anguste linearibus ramisque floriferis brevibus 3–5-floris subsericeo-pilosis, floribus subcapitatis flavis, siliquis 1″ erectis valvis planis stellatim pilosis, stylo brevi, stigmate parvo.

Hab. In Affghanistan alpibus Kohi baba, alt. 14000–15500 ped. lapidosis! *Griffith.*

Species pumila, 2–3″. *Folia* vix pollicaria, superne sensim dilatata, vix $\frac{1}{12}$″ lata, integerrima, obtusa, superne concava. *Rami* floriferi $\frac{1}{2}$″, *flores* $\frac{1}{3}$″ longi. *Sepala* erecta, obtusa, sparse pilosa. *Siliquæ* $\frac{1}{10}$″ latæ, apice acuminatæ; valvis planis, medio obscure costatis. *Semina* sub 8, oblonga, compressa, anguste alata; funiculo tenui, stricto, æquilongo.

C. Cheiri, L., is cultivated in Northern India.

Dr. Stocks remarks that *C. pulchellus*, Willd., is cultivated in Beluchistan; his specimens so named are not in fruit, and resemble a garden *Erysimum* very closely.

We have from Zanskar (alt. 12000–14000 ped.) what may prove a third Indian *Cheiranthus*: it is a small, woolly, alpine plant, closely resembling *C. Himalaïcus*; but the leaves are entire, and the flowers white: it is not in fruit.

5. Atelanthera, *H. f. & T.*

1. A. perpusilla, *H. f. & T.*

Hab. In Himalaya occidentali temperata ad Zanskar! *T. T.* (fl. Jun.) (v.v.)

Herbula minuta, tenuis, annua.

6. Nasturtium, *Br.*

The Indian species of this genus are excessively variable; and the following are, with the exception of *N. officinale*, perhaps to be regarded as prevalent forms rather than constantly distinct species.

1. N. officinale (*Br. Hort. Kew.* ed. 2, iv. 110). Foliis pinnatisectis, superioribus 3–7-jugis, inferioribus trisectis segmentis repandis, petalis albis, siliquis linearibus, valvis costatis.

Hab. Affghanistan! *Griffith*; Kumaon ad Almora, alt. 5500 ped! *Jacquemont, Str. & Wint.*; mont. Nilgherrie, *Gardner*! Kashmir! *T. T.* (fl. Jun.) (v.v.)

Distr. In rivulis temperatis hemisphæræ borealis totæ.

We have specimens of this (the common English Watercress) from several collectors, but doubt its being native.

2. N. terrestre (*Br. Hort. Kew.* ed. 2, iv. 110). Suberectum, foliis integris pinnatilobatisve, lobis confluentibus sinuato-dentatis, racemis ebracteatis, petalis flavis, siliquis brevibus turgidis ($\frac{1}{4}$–$\frac{1}{3}$″), pedicellis horizontalibus v. deflexis, stylo brevi.

Engl. Bot. t. 174.—N. palustre, *DC. Syst.* ii. 191.—N. Madagascariense, *DC. l. c.* 192.—N. heterophyllum, *Don, Prodr.*

Hab. In Himalaya temperata tota, alt. 4000–10000 ped., a Sikkim! (*J. D. H.*) ad Kashmir! (*Jacquemont*); Punjab! *T. Thomson*; Bengalia inferiore! *J. D. H. & T. T.*; Assam superiore! *Griffith.* (fl. tot. ann.) (v.v.)

Distr. Europa! Asia borealis tota, Persia! America borealis ab mare arctico ad Mexico! Am. merid. temp.! Australia! Nova Zelandia.

3. N. Indicum (*Linn. Mant.* 93; *DC. Syst.* ii. 199). Robustum, ramosum, foliis obovato-lanceolatis integris v. runcinato-pinnatifidis, racemis ebracteatis, petalis pallidis v. 0, siliquis teretibus ($\frac{1}{2}$–$\frac{3}{4}$″) pedicellis 4-plo longioribus patulis erecto-patentibusve.

N. Madagascariense, *W. & Arn. Prodr.* i. 19; *Wight, Ill.* t. 13; an *DC.*? —N. heterophyllum? *Blume, Bijd.* 50.

Hab. Per totam Indiam tropicam et subtropicam copiose, a Kashmir! et Panjab! ad Mishmi! et Ceylon! *Walker.* (fl. tot. ann.) (v.v.)

Distr. China! Java!

Planta valde variabilis, plerumque robustior quam *N. terrestre* et foliis magis obovatis integrioribusque, sed exemplaria depauperata gracilia evadunt et foliis varie lobulatis gaudent. *Siliquæ* plerumque longiores strictiores et erectiores quam in *N. terrestri.*

4. N. MONTANUM (*Wall. Cat.* 4778, ex parte). Omnia *N. Indici*, sed siliquis longioribus (1–1½″) gracilioribusque.

Hab. In Himalaya tropica et subtropica, alt. 1000–7000 ped., a Simla! ad Sikkim! Punjab! *T. Thomson*; Bengal! et Ava! *Wallich, &c.*; mont. ad Khasia! *Griffith, &c.* (fl. tot. ann.) (v.v.)

Distr. Java! China! Japan! et Loo-choo!

Manifestly a long-fruited form of *N. Indicum*, which is mixed with it in Wallich's distribution.

5. N. BENGHALENSE (*DC. Syst.* ii. 198). Omnia *N. Indici*, sed plerumque pubescens et racemis bracteatis.

Sinapis Benghalensis, *Roxb. MS. fid. DC.*—Sinapis patens, *Roxb. fid. Carey in Herb. Hook.*—An var. bracteata *N. Indici*?

Hab. In Bengalia inferiore! *Roxburgh, &c.*; Assam! *Jenkins*; Khasia! et Silhet! Sikkim tropica! Chittagong! *J. D. H. & T. T.*; Pegu! *M'Clelland*; Ava! et Mergui! *Griffith.* (fl. temp. pluv.) (v.v.)

Distr. China.

This appears to be nothing but a bracteated form of *N. Indicum*, the bracts being sometimes wholly wanting on some of the racemes and present on others of the same specimen; sometimes they are found at the base of every pedicel, sometimes of the lowest only.

7. BARBAREA, *Br.*

1. B. VULGARIS (*Br. in Hort. Kew.*). Foliis omnibus lyrato-pinnatisectis, inferioribus lobo terminali ovato-cordato v. rotundato, superioribus oblongis sinuato-lobatis v. basi pinnatifidis, pedicellis fructu patulis, siliquis compressis valvis costatis, stylo breviusculo. (Descript. ab exempl. Indicis.)

Var. *α*. Siliquis strictiusculis, stylo distincto.—Inter *B. vulgarem* et *B. strictam* auct.

Var. *β*, *arcuata*. Siliquis gracilibus curvis, stylo distincto.—*B. arcuata* auct.

Var. *γ*, *præcox*. Siliquis robustioribus, stylo indistincto.—*B. præcox* auct.

Hab. *α* et *β* in Himalaya temperata et alpina, alt. 6000 ad 16000 ped., a Sikkim! ad Kashmir! et in Tibetia occidentali. (fl. Mai.–Jul.) (v.v.)

β in mont. Nilghiri, cultis! β et γ Affghan.! *Griffith*. (fl. Jul.–Sept.) (v.v.)

Distr. Europa tota! America borealis subarctica, temperata, et tropica in alpibus! Asia borealis et occidentalis! Australia temperata! Nova Zelandia!

Herba erecta, 6–18″, subfoliosa. *Folia* primordialia longe petiolata, sæpe integra, cordato-rotundata; cætera pinnatisecta, rarissime integra, lobis lateralibus plerumque alternis linearibus sinuato-dentatis, terminali forma varia. *Flores* flavi. *Siliquæ* graciles, $\frac{1}{3}$–$\frac{2}{3}$″, curvæ, stylo crassiusculo mediocri terminatæ; valvæ planiusculæ; costa crassa; septum enerve. *Semina* 1-seriata, septo angustiora; testa punctulata, fusco-rufa; radicula elongata.

2. B. ELATA (*H. f. & T.*). Caule subsimplici stricto elato robusto, foliis radicalibus lyrato-pinnatisectis pinnatifidisve lobo terminali oblongo sinuato obtuso, caulinis sessilibus v. petiolo alato auriculato obovato-lanceolatis obtusis sinuato-lobatis integrisve, racemis fructiferis valde elongatis, siliquis erectis elliptico-lanceolatis, pedicellis strictis erectis, valvis concavis costatis, stylo brevi.

Hab. In Himalaya orientali temperata et subalp. Sikkim, alt. 11000–13000 ped.! (fl. Jun.) (v.v.)

Species distinctissima, 1–3-pedalis. *Caulis* robustus, striatus. *Folia* radicalia submembranacea, 2–4″ longa, pinnatisecta v. subintegra; caulina 2″, in petiolum alatum plerumque angustata. *Flores* majusculi, flavi. *Sepala* erecta. *Petala* $\frac{1}{4}$″ longa, flava. *Racemus* florifer valde elongatus, interdum pedalis, strictus, robustus. *Siliquæ* subsparsæ, pro planta breves, cauli subappressæ, $\frac{1}{2}$–$\frac{2}{3}$″ longæ, strictæ, latiusculæ, subteretes, utrinque acutæ, stylo manifesto terminatæ; valvis valde convexis, 1-nerviis, nitidis; pedicello stricto, erecto, siliqua $\frac{1}{2}$ breviore et multoties tenuiore; septo enervi. *Semina* 1-seriata, turgida, ovato-oblonga; testa rufo-brunnea, rugulosa, crassiuscula, funiculo breviusculo.

A very handsome and distinct species, remarkable for its tall, strict habit, much elongated raceme of pods, large flowers, and the short broad pods (compared with those of other species), which are intermediate in character between those of *Barbarea* and *Nasturtium*, the valves being very convex, with a distinct, but not very prominent midrib or keel. It was found growing wild in rocky grassy places, and also about cottages.

8. ARABIS, *L.*

§ 1. *Turritis*. Semina subbiseriata.

1. A. GLABRA (*Crantz*. Turritis, *Linn. Sp. Pl.* 930). Caule simplici stricto erecto glabro, foliis radicalibus integris v. runcinato-dentatis pilosis, caulinis glabris cordato-sagittatis erectis, siliquis strictissimis.

Turritis glabra, *DC. Syst.* ii. 211, *Prodr.* i. 142; *Engl. Bot.* t. 777; *Led. Flor. Ross.* i. 116.—T. rigida, *Wall. Cat.* 4783.

Hab. In Himalaya occidentali temperata, Kumaon! *Blink*; Garwhal, *Str. & W.*; Kumaon ad Kashmir, 7000–9000 ped.! *Winterbottom, &c.* (fl. Jun.) (v.v.)

Distr. Europa tota! America borealis temperata! Asia minor! Siberia! Australia extratropica!

Caulis robustus, 1–3′, teres. *Folia* radicalia sæpius rosulata, 2–4″, lineari-oblonga, obtusa, pilis ramosis patulis; caulina semiamplexicaulia, obtusa v. acuta. *Racemus fructifer* elongatus, virgatus. *Flores* majusculi, fere $\frac{1}{4}$″ lati. *Siliquæ* cauli appressæ, exacte lineares, 2–3″, vix $\frac{1}{20}$″ latæ; pedicello $\frac{1}{3}$″, gracili; valvis planis, valide costatis; septo completo, enervi. *Semina* minuta, funiculis elongatis arcuatis pendula, subquadrato-oblonga v. orbiculata, compressa, punctulata.

§ 2. *Alomatium*, DC. Semina 1-seriata, aptera v. ala membranacea angusta.

2. A. AURICULATA (*Lam. Encycl.* i. 219). Annua, erecta, gracilis, hispido-puberula, foliis membranaceis, radicalibus petiolatis oblongis obtusis sinuato-dentatis, caulinis sessilibus semiamplexicaulibus ovato-oblongis obtusis dentatis, siliquis erecto-patentibus strictis, pedicellis brevibus crassis, seminibus apteris ellipticis pallidis, funiculis liberis.—*DC. Prodr.* i. 143; *Led. Fl. Ross.* i. 118.

A. Sinaïca, *Boiss. Diagn.* viii. No. 8, p. 21.—A. Aucheri *et* A. Montbretiana, *Boiss. in Ann. Sc. Nat.* sér. 2, xvii. 53.

Hab. Affghanistan! *Griffith*; in Himalaya maxime occidentali temperata, Kashmir! alt. 5000–6000 ped., *T. T.* (fl. April.–Mai.) (v.v.)

Distr. Europa media! et australis! Hispania! Algeria! Asia minor! Podolia! Tauria! Syria! Persia!

Gracilis, erecta, spithamæa v. pedalis, pilis ramosis hispida; superne glabra: caule simplici v. parce diviso. *Folia* radicalia 1–2″, primordialia obovata; caulina sensim minora. *Flores* $\frac{1}{10}$–$\frac{1}{8}$″. *Sepala* lineari-oblonga, glabrata. *Petala* alba, lineari-spathulata, obtusa, longe unguiculata. *Siliquæ* strictæ, 1–1$\frac{1}{2}$″ longæ, $\frac{1}{20}$″ latæ, subacutæ; pedicello brevi, crasso, superne incrassato. *Valvæ* (sicco) nervosæ, costa distincta glabra. *Septum* enerve, creberrime lineolis tortuosis areolatum. *Semina* parva, pallida; testa minute punctulata.

Diagnosis et descriptio ad exemplaria Kashmirica.

3. A. ALPINA (*Linn.*). Biennis v. perennis hispidulo-pilosa, caulibus strictiusculis suberectis, foliis oblongis obtusis integris sinuatis dentatisve, radicalibus obovatis petiolatis, caulinis sessilibus basi truncatis auriculato-bilobisve, floribus magnis albis, pedicellis gracilibus, siliquis patulis anguste linearibus, valvis tenuiter venosis, seminibus compressis orbicularibus tenuiter marginatis.—*DC. Prodr.* i. 142; *Led. Fl. Ross.* i. 117.

A. hirsuta! et grandiflora! *Hb. Royle.*—A. pterosperma, *Edgew. in Linn. Soc. Trans.* xx. 33.

Hab. In Himalaya occidentali temperata, alt. 5000–11,500 ped. vulgaris, a Kumaon! *Str. & Wint.*; ad Kashmir! *Jacq.*; et Marri! *Fleming.* (fl. Jun.)

Distr. Europa! Asia! et America boreali temperata et arctica!

Caules 2 v. plures e radice. *Folia* radicalia 2–4″, oblonga, lineari-oblonga v. oblongo-spathulata; caulina plerumque lineari-oblonga. *Flores* $\frac{1}{3}$″ et ultra. *Sepala* glabra, lineari- v. ovato-oblonga. *Petala* anguste spathulata, longe unguiculata. *Siliquæ* juniores erectæ v. patentes, interdum horizontales, pedicello $\frac{1}{3}$–$\frac{2}{3}$″; maturæ suberectæ, 1–1$\frac{1}{4}$″ long., $\frac{1}{14}$″ latæ; omnes strictiusculæ v. subcurvæ, anguste lineares, subacutæ. *Semina* matura non visa, funiculis liberis. *Septum* enerve, crebre lineis tortuosis areolatum.

4. A. AMPLEXICAULIS (*Edgew. in Linn. Trans.* xx. 31). Perennis? elata, ramosa, hispido-pilosa, ramis subflexuosis gracilibus foliosis, foliis integris v. sinuato-dentatis, radicalibus obovato-oblongis petiolatis, caulinis ovato-oblongis basi latis caudato-bilobis amplexicaulibus, floribus magnis, pedicellis gracilibus, siliquis patentibus decurvisve anguste linearibus acutis, valvis tenuiter venosis, seminibus majusculis oblongis punctatis immarginatis.

A. Kanawarensis *et* patens, *Hb. Royle*!

Hab. In Himalaya temperata occidentali, alt. 8000–9000 ped., Kumaon! *Jacq.*, *Edgeworth*! *Str. & Wint.*! ad Kashmir! *Winterbottom.* (fl. Mai.) (v. v.)

A. alpinæ affinis et dum floret interdum vix distinguenda, sed plerumque multo major et elatior, foliis latioribus amplioribus, siliquis patentibus elongatis plerumque acutioribus et seminibus forma magnitudine et colore diversa.—*Radix* biennis v. perennis. *Folia* radicalia 2–4″. *Caules* v. *rami* 1–2′, patentes, teretes, superne glabrati. *Flores* ut in *A. alpina.* *Siliquæ* 2–3″, interdum stylo gracili tenui stricto terminatæ. *Valvæ, funiculi* et *septum* ut in *A. alpina.* *Semina* oblonga, grosse foveolato-punctulata, fusco-brunnea.—Variat statura et exemplaribus alpinis glabridioribus brevioribus.

This plant resembles *A. Turrita* in habit and general appearance, but is more slender in all its parts, and the seeds are not winged.

5. A. NUDA (*Bel.*! *Voy., fid. Boiss. Ann. Sc. Nat.* xvii. 54, *et in Walp. Ann.* i. 131). Annua, pusilla, pubescens v. glabrata, foliis omnibus radicalibus rosulatis obovatis oblongisve petiolatis integris v. grosse paucidentatis, scapis erectis nudis, floribus parvis breve pedicellatis, siliquis suberectis 1–1$\frac{1}{2}$″ linearibus obtusis, valvis costa valida, seminibus uni- v. biseriatis septo angustioribus, radicula oblique accumbente.

A. scapigera, *Boiss. l. c.*

Hab. In Himalaya maxime occidentali temperata, Kashmir, alt. 5600–6000 ped.! *T. T.*; Affghanistan! *Griffith.* (fl. April.) (v.v.)

Distr. Persia! Mesopotamia! Asia minor!

Radix gracilis. *Folia* plurima, rosulata, $\frac{1}{2}$–$\frac{3}{4}$″, submembranacea, obtusa, pilosa, integerrima v. grosse paucidentata. *Scapi* seu *caules* 2–8, basi curvi, dein erecti, sæpe flexuosi, 1–2″, rigidi, glabri. *Pedicelli* breves, $\frac{1}{8}$–$\frac{1}{12}$″, fructiferi incrassati, validi, patuli. *Flores* parvi, albi. *Sepala* æqualia, erecto-patentia, ovato-oblonga, obtusa, glaberrima. *Petala* sepalis paulo longiora, anguste unguiculata; lamina spathulata, obtusa. *Stamina* sepalis æquilonga, filamentis subulatis liberis; antheris parvis, late oblongis. *Ovarium* teres, stigmate sessili. *Siliqua* recta v. curva, compressissima, exacte linearis, obtusa, $\frac{3}{4}$–1$\frac{1}{4}$″ longa. *Valvæ* venosæ et costatæ. *Septum* completum, enerve, subtilissime lineis tortuosis areolatum. *Semina* 1- v. 2-seriata, funiculis elongatis arcuatis liberis pendula, late oblonga, compresse punctulata. *Cotyledones* oblongæ, radicula oblique accumbente.

6. A. Thomsoni (*H. f.*). Annua, e basi ramosa, foliis anguste lineari-spathulatis obovatisve sinuato-lobatis utrinque pilis stellatis laxis cano-pubescentibus, caulinis petiolatis, floribus gracile pedicellatis, siliquis patentibus falcatis (3″ long., 1$\frac{1}{2}$″ lat.) in stylum brevem acuminatis, valvis planis costa tenui, seminibus anguste alatis.

Hab. In Himalaya occidentali temperata, inter Kashmir et Dras, alt. 9000–10000 ped.! *T. T.*; et in Tibetia occidentali, Zanskar! et Ladak! alt. 10000–14000 ped., *T. T.* (fl. Jun.)

I have examined one good fruiting specimen, gathered by Dr. Thomson on his descent from Dras into Kashmir (29th Sept. 1848); and there are many others from Zanskar and Ladak which may belong to it or to the following, from which in the fruiting state it differs conspicuously in its much larger size, long curved pods, and broad winged seeds.

7. A. Tibetica (*H. f. & T.*). E basi ramosissima, ramis divaricatis prostratisve, foliis parvis obovato-spathulatis sinuato v. lyrato-lobatis cano-pubescentibus subvillosisve, caulinis paucis petiolatis, siliquis suberecto-patentibus angustis (1–2″ long., $\frac{1}{15}$″ lat.) acuminatis, valvis subtorulosis planiusculis nervo medio tenui, seminibus parvis oblongis non alatis.

? A. attenuata, *Royle, Herb.*

Hab. In Tibetia occidentali temperata et alpina, alt. 10000–16000 ped. Zanskar! Ladak! Sassar! Nubra! *T. T.*; Balti! *Winterbottom, T. T.* (fl. Jun.–Jul.)

Very similar to *Arabis petræa*, Lam., but the whole plant is much more pubescent with stellate hairs, the pods narrower, longer, more acuminate and erect, and the flowers smaller. Also allied to *A. Thomsoni*; but the capsules are much shorter, narrower, and the seeds not margined. Also very similar to *Sisymbrium humile*, C. A. M.

8. A. glandulosa (*Kar. & Kir. En. Plant. Soong.* 67; *Led. Fl. Ross.* i. 750). Humilis, sparse glandulosa, pilosa, foliis pinnatifido-lobatis,

ramis brevibus divaricatis prostratis, floribus albis, pedicellis calycibus siliquisque glandulosis, siliquis suberectis linearibus obtusis (1″ long., $\frac{1}{24}$″ lat.), valvis concavis subenervibus.

Hab. In Sikkim regione interiore alpina, alt. 14000–16000 ped.! *J. D. H.* (fl. Jun.) (v.v.)

Distr. Soongaria!

A very distinct little species, rather fleshy, with something of the foliage of *Senebiera*; easily recognized by the glandular hairs on the foliage and stems, and the glands of the inflorescence and pods. The seeds are young; but the radicle is manifestly accumbent.

In Dr. Thomson's and in Mr. Winterbottom's Tibetan and N.W. Himalayan collections are many specimens of *Cruciferæ* that may be referable to species of *Arabis*, but which, being without ripe fruit, cannot be distinguished generically from *Sisymbrium*. Some resemble closely Persian and Siberian species.

9. Cardamine, *L.*

a. *Folia omnia integra.*

1. C. violacea (*Wall. Cat.* 4782). Elata, robusta, foliis sessilibus basi sagittato-auriculatis lanceolatis acuminatis denticulatis, floribus magnis violaceis, siliquis magnis valvis concavis, stylo rigido elongato.

Erysimum violaceum, *Don, Prod.* 202.

Hab. In Nipal ab Gossain-Than! *Wallich.*

Erecta, simplex, 3-pedalis. *Folia* 2–3″, superiora puberula. *Flores* $\frac{1}{2}$–$\frac{3}{4}$″ lati, intense violacei. *Siliquæ* longe pedicellatæ, erectæ, 1–1$\frac{1}{2}$″ longæ, utrinque attenuatæ; stylo $\frac{1}{4}$″, replo lato; valvis enervibus, concavis.

2. C. circæoides (*H. f. & T.*). Perennis, caule simpliciusculo pilosulo, foliis longe petiolatis cordatis sinuatis obtusis membranaceis, floribus parvis albis, siliquis angustis utrinque attenuatis, stylo distincto, stigmate latiusculo.

Hab. In Himalaya orientali temperata, Sikkim interiore, sylvis, alt. 5000–7000 ped.! *J. D. H.* (v.v.)

Species valde distincta, pedalis, gracilis. *Petioli* 1–2″. *Folia* 1–1$\frac{1}{2}$″, $\frac{3}{4}$–1$\frac{1}{4}$″ lat., lobis basi cordata rotundatis. *Racemi* elongati. *Flores* albi. *Siliquæ* erecto-patentes, pollicares, $\frac{1}{10}$″ lat., replo valido; valvis enervibus, convexis.

b. *Folia omnia 3-foliolata.*

3. C. Africana (*Linn.*). Foliis 3-foliolatis, foliolis amplis petiolulatis ovatis obtusis acutisve crenato-serratis, lateralibus basi obliquis cordatisve, floribus albis, siliquis magnis erectis utrinque acuminatis, stylo distincto v. 0.

C. Borbonica, *Persoon, Wight & Arn. Prodr.*; *Wight, Ic.* 941.—C. Wightiana, *Wall.*—C. Auteniquana, *Busch in DC. Prodr.* i. 157.

Hab. In mont. Nilghiri, alt. 6000–8000 ped.! *Wight, &c.*; Ceylon! *Walker, Thwaites, &c.*

Distr. Africa austr.! Bourbon!

Affinis *C. angulatæ*, Hook., Americæ borealis, sed floribus minoribus pedicellisque plerumque brevioribus.

4. C. TRIFOLIOLATA (*H. f. & T.*). Cæspitosa, glaberrima, caule erecto simpliciusculo parce foliato, foliis radicalibus longe gracile petiolatis, foliolis 3 breve petiolulatis rotundatis sinuato-lobatis caulinis subsimilibus, racemo paucifloro, floribus lilacinis?, petalis obovatis vix unguiculatis.—? *Griff. It. Not.* 121, No. 359 (1757 *Hb. Hk., &c.*).

Hab. In Himalaya orientali, reg. temp., Bhotan! *Griffith.*

Herba subcarnosula, spithamæa, erecta, habitu fere *Adoxæ*. *Rhizoma* breve, repens. *Caules* graciusculi. *Foliola* ⅓″ diametro, carnosula, glaberrima, lobulis rotundatis apiculatis. *Flores* pro planta magni, ⅓″ diam. *Petala* sepalis duplo longiora. *Siliqua* ignota.

c. *Folia omnia, v. radicalia tantum, pinnatisecta.*

5. C. PRATENSIS (*Linn.*). Perennis, caule erecto, foliis radicalibus foliolis late ovatis orbiculatisve, caulinis oblongis linearibusve, floribus magnis, petalis albis purpureisve, siliquis erectis pollicaribus.

Hab. In Tibetia occidentali, prope Waylari, in Hasora! *Winterbottom.*

Distr. Europa tota! Asia minor! Persia! Siberia! America borealis temp. et arctica! Tasmania!

6. C. MACROPHYLLA (*Willd. Sp. Pl.* iii. p. 484).—Rhizomate repente radicante, caule elato, foliolis 3–5-jugis ovatis oblongis lanceolatisve grosse crenato-lobatis subpinnatifidisve, siliquis erectis magnis utrinque attenuatis, stylo elongato.—*C. polyphylla*, Don, Prodr. p. 201.

α. Floribus albis violaceisve, foliolis intermediis ovato-lanceolatis obtuse inciso-crenatis serratisve, siliquis ½–1¼″ long.—*C. macrophylla* auct., Led. Fl. Ross. i. p. 128; Ic. Fl. Alt. t. 146.—*C. dentariæfolia*, Hb. Royle.

β. Floribus albis, foliolis intermediis lanceolatis inæqualiter subpinnatifido-serratis, siliquis 1½″ long. pallidis.—*I. foliosa*, Wall. Cat. 4779.

γ. Floribus et siliquis var. *β*, foliolis ovato-lanceolatis grosse obtuse inæqualiter lobulatis.

δ. Robusta, floribus intense violaceis amplis, foliolis ovato-lanceolatis obtuse serratis, siliquis magnis brunneis 1½″ long.

Hab. In Himalaya temperata tota, alt. 7000–12000 ped., a Kashmir! *Jacq.*, ad Sikkim! *J. D. H.*—*α*, *β*, *γ*, Kashmir ad Kumaon! *δ*, Sikkim! (fl. Mai.) (v.v.)

Distr. Soongaria! Siberia, ab Ural! Manchuria! Japan.

A very variable plant, of which the stout fleshy eatable (pot-herb) Sikkim form with large brown pods would rank as a different and very distinct

species, were it not connected with the Western Himalayan and Siberian forms by all intermediate grades.

7. C. IMPATIENS (*Linn.*). Erecta, gracilis, foliolis multijugis segmentis parvis petiolulatis ovato-oblongis obtuse 3–5-lobis, petiolis foliorum caulinorum basi auriculato-lobatis, siliquis gracilibus.

Hab. In Himalaya temperata tota, alt. 5000–12000 ped., ab Affghanistan! *Griff.*, ad Sikkim! *J. D. H.* (fl. Mai.) (v.v.)

Distr. Europa tota! Persia! Siberia! Caucasus! Asia minor! Japan.

8. C. HIRSUTA (*Linn.*). Debilis, decumbens v. suberecta, foliolis 2–4-jugis petiolulatis suborbiculatis repando-dentatis crenatisve.

C. Nilagirica, *Schlt.*—? C. debilis, *Don, Prodr.* p. 201.

Var. *α*. Caule suberecto, foliolis ovato-cordatis lobulatis, siliquis sublonge acuminatis.

Var. *β*. Caule diffuso, foliolis ovatis sinuato-lobulatis, siliquis acutis, stylo brevi.

Var. *γ*. Caule diffuse ramoso, foliolis ut in *α*, siliquis acuminatis, stylo elongato.—*C. oxycarpa*, Boiss.

Hab. In Himalaya temperata tota, alt. 4000–12000 ped., ab Kashmir! *T.T.*, ad Bhotan! *Griffith*; necnon in umbrosis humidis montium Khasia! Peninsulæ! Ceylon! et Mishmi! *Griff.* (fl. tot. ann.) (v.v.)

Distr. Ubique terrarum! regionibus temperatis.

The erect forms are not always readily distinguishable from *C. impatiens*, except by the absence of the lobules at the base of the petioles of the cauline leaves.

9. C. ELEGANTULA (*H. f. & T.*). Humilis, tenella, gracillima, foliolis 5–7-jugis remotis oppositis divaricatis lineari-oblongis sublobatis 3-nervibus, racemo paucifloro, petalis obovatis spathulatis sepalis duplo longioribus, siliquis gracilibus acuminatis patentibus.

Hutchinsia, sp., *Griff. It. Not.* p. 195 (No. 1079).

Hab. In Himalaya temperata orientali, Bhotan! alt. 6500 ped., *Griffith.*

Herba pallide virescens, 2-pollicaris, tenerrima. *Caules* vage ramosi. *Folia* 1–2″ long., glabra. *Foliola* $\frac{1}{4}$″ long., petiolulata; superiora sessilia; omnia integra v. lobata, 3-nervia, venulis transversis paucis. *Flores* albi v. rosei, diametro foliolorum. *Sepala* glabra. *Siliquæ* gracile pedicellatæ, $\frac{1}{2}$–$\frac{3}{4}$″; stylo brevi.

10. C. GRIFFITHII (*H. f. & T.*). Erecta, glabra, foliolis 3–5-jugis, petiolis basi utrinque foliolis orbiculatis instructis, foliolis sessilibus elliptico-orbiculatis sinuatis, floribus lilacinis, petalis sepalis duplo longioribus.

Cardamine, *Griff. It. Not.* p. 158 (No. 996).

Hab. In Himalaya temperata orientali, Bhotan, ad Lamnoo, aquosis! *Griff.*

Herba 6–12-pollicaris, caule angulato sulcato, foliis inferioribus depressis. *Folia* 1–2″ long., foliis $\frac{1}{3}$″ diam., nervis divaricatis. *Flores* $\frac{1}{4}$″ lati.

The pinnules at the base of the petiole on each side seem to afford a

good character for this species, of which I have seen but two poor specimens.

There is another species of *Cardamine* in India, from Tibet, north of Kumaon, alt. 13000–15200 feet (*Strachey & Winterbottom*), resembling *C. purpurea*, Cham., and perhaps referable to *C. amara*, but in too imperfect a state for determination.

10. Loxostemon, *H. f. & T.*

1. L. pulchellus, *H. f. & T.*

Hab. In Himalaya orientali temperata; Sikkim graminosis humidis! alt. 10000–13000 ped., *J. D. H.* (fl. Jun.) (v.v.)

A very elegant little plant, resembling a small slender *Cardamine*, with violet-coloured flowers, and toothed bulbils on the filiform base of the stem.

11. Notoceras, *Br.*

1. N. canariense (*Br. Hort. Kew.* ed. 2, iv. p. 117). Foliis lanceolatis, siliquis bicornutis.—*Jacq. f. Eclog.* t. iii.; *DC. Prodr.* i. p. 140.

Erysimum bicorne, *Ait. Hort. Kew.* xi. p. 394; *DC. Syst.* ii. p. 203.

Hab. Affghanistan, in triticetis! *Griffith*; Punjab ad Peshawar! *Vicary*; Beluchistan! *Stocks.* (fl. vere.)

Distr. Ins. Canaries! Hispania! Algeria! Tunis! Arabia!

Herba spithamæa, e basi ramosa, tota appresse pilosa. *Folia* pollicaria, utrinque pilosa. *Flores* parvi, ut videtur albi (lutei *ex DC.*). *Sepala* pilosa, oblonga. *Petala* parva. *Siliquæ* subsessiles, erectæ, cauli appressæ, $\frac{1}{4}$–$\frac{1}{3}''$ longæ, obtusæ. *Valvæ* coriaceæ, plano-convexæ, carinatæ; carina valida, in cornu suberectum producta. *Septum* completum, crassum, enerve. *Replum* subulatum. *Semina* sub 3, 1-seriata, orbiculata, compressa, funiculo patente longiora; *testa* lævi, non cellulosa.

12. Farsetia, *Turra.*

1. F. ægyptiaca (*Turr. Diss. Fars.* i. t. 1, *ex DC. Prodr.* i. 157). Fruticulosa, floribus magnis, calyce cylindraceo, siliquis late v. lineari-oblongis, stylo brevissimo, valvis non costatis.

F. ovalis, *Boiss. Diag.* viii. 32; *Cruciff. Griff. It.* p. 366 (No. 11).

Hab. Affghanistan! *Griffith.*

Distr. Algeria! Ægypt.! Arabia!

The pods characteristic of Boissier's *F. ovalis* occur on the same specimens with the longer, commoner form of fruit.

2. F. Edgeworthii (*H. f. & T.*). Foliis anguste linearibus, petalis elongatis calycem cylindraceum superantibus, siliquis lineari-oblongis, stylo brevi, valvis medio alte costatis, septo integro.

Hab. Panjab in rupibus ad Chundur-dak in Salt Range! *Edgeworth, Fleming.* (fl. Jan.)

F. Ægyptiacæ valde affinis, differt siliquis longioribus medio alte carinato-costatis.

3. F. Jacquemontii (*H. f. & T.*). Foliis linearibus lineari-spathulatisve, petalis elongatis calycem cylindraceum longe superantibus, siliquis linearibus, stylo breviusculo, valvis obscure costatis ecostatisve, septo integro.

? Arabis heliophila, *DC. Syst.* ii. 237.—*An* F. longisiliqua, *Dcne. in Ann. Sci. Nat.* sér. 2, vol. iv. p. 69.

Hab. Affghanistan! *Griffith*; Beluchistan! *Stocks*; Punjab, ad Pindadur-Khan! *Jacquemont*; Multan! *Edgeworth*; Loodianah! *T.T.*; Scind! *Dalzell*; Salt Range! *Fleming*.

4. F. Hamiltonii (*Royle, Ill.* p. 71). Floribus parvis, calyce oblongo, siliquis linearibus, stylo gracili.

F. linearis, *Hook. Ic. Plant.* t. 808, non *Decaisne in Ann. Sc. Nat.* sér. 2, vol. xvii. p. 150.—Cheiranthus Farsetia, *Wall. Cat.* 4081.—Mathiola stylosa, *Hoch. & Steud.*—Arabis incanescens, *Munro, Plants of Agra*.

Hab. In planitie Gangetica superiore inter Agra et Delhi! *Wallich, &c.*; Punjab! *T. T.*

F. lineari, Dcne., simillima, sed flores multo minores.

13. Alyssum, *L.*

§ 1. *Alyssum.* Filamenta appendiculata; siliqua orbiculata compressa, 2–4-sperma, valvis convexis funiculis septo adhærentibus.

1. A. minimum (*Willd., DC. Syst.* ii. 316). Annuum, cano-pubescens, foliis oblongo-linearibus v. lineari-obovatis, racemis demum elongatis, siliquis emarginatis glaberrimis, staminibus omnibus appendiculatis, stylo brevi.—*Led. Fl. Ross.* i. 140; *Griff. It.* 235 (No. 261), et 366 (No. 9).

Hab. In Himalaya maxime occidentali temperata, Kashmir, alt. 4000-6000 ped.! *Jacq*, *T. T.*; Affghanistan, copiosissime! *Griffith, Vicary*. (fl. April.) (v.v.)

Distr. Siberia! Caspian! Asia minor! Hungaria! Austria.

2. A. Szovitsianum (*Fisch. & Mey., Led. Fl. Ross.* i. 139). Diffusum, pube stellata incano-tomentosum, foliis anguste oblongis obovatisve, siliquis racemosis orbicularibus cano-tomentosis.

A. marginatum, *Steud.*!, *ex Boissier in Ann. Sc. Nat.* vol. xvii. p. 157; *Griff. It.* p. 235 (No. 262).

Hab. In Affghanistan scopulosis ad Munzil! *Griffith*; Beluchistan! *Stocks*.

Distr. Persia! Asia minor! Arabia.

§ 2. *Psilonema,* C. A. M. Filamenta simplicia.

3. A. dasycarpum (*Stephan. in Willd.*). Tota pilis stellatis cano-tomentosum, foliis obovatis elliptico-obovatisve, siliquis ellipticis dense tomentosis, stylo elongato.

Psilonema dasycarpa, *C. A. Meyer, Led. Fl. Ross.* i. p. 137; *Griff. It.* p. 238 (No. 299 partim).

Hab. In Affghanistan! *Griffith*; triticetis ad Sinab, Beluchistan! *Stocks.*

Distr. Soongaria! Persia! Caspian! Asia minor.

§ 3. *Meniocus.* Siliqua elliptica, compressissima, valvis planis. Filamenta omnia appendiculata.

4. A. LINIFOLIUM (Meniocus, *DC. Syst.* ii. 325). Siliquis glabris, stylo brevi.—*Griff. It. Not.* p. 346 (No. 89), and p. 238 (No. 299).

Hab. In Affghanistan, arvis prope Otipore! Akrobat, etc.! *Griffith*; Beluchistan! *Stocks.* (v.s.)

Distr. Altai! Soongaria! Persia! Syria! Caspian! Asia minor! Illyria! Hispania!

§ 4. *Ptilotrichum,* C. A. M. Siliqua elliptica ovata v. orbicularis, 1–2-sperma. Filamenta omnia simplicia.

5. A. CANESCENS (Ptilotrichum, *C. A. Meyer, Led. Fl. Alt.* iii. p. 66). Incano-tomentosum, cæspitosum, caulibus scapisque brevibus, scapis foliosis, foliis anguste linearibus obtusis, siliqua elliptica acuta molliter tomentosa, stylo gracili.—*Led. Fl. Ross.* i. 143; *Ic. Fl. Alt.* t. 273.

Hab. In Tibetia occidentali alpina, alt. 14000–17000 ped., Piti! Parang! Nubra! Ladak! *T. T. & H. Strachey*; Kumaon, alt. 15000 ped.! *Str. & Wint.* (fl. Jul.) (v.v.)

Distr. In summis montibus Soongariæ et Altai!

Radix et *caulis* basi lignosa. *Folia* dense conferta, pollicaria, enervia, crassiuscula. *Caules floriferi* seu *scapi* 1–3″ long. *Sepala* patula. *Petalorum* lamina reniformi-rotundata, undulata. *Filamenta* filiformia, edentula. *Stigma* capitatum. *Siliqua* $\frac{1}{10}$–$\frac{1}{15}$″ long.; valvis coriaceis, convexis; stigmate capitato. *Semen* quovis loculo solitarium, orbiculari-obovatum; funiculo breviusculo.

14. DRABA, *L.*

§ 1. *Erophila.* Annua. Petala bipartita.

1. D. verna, *L., Griff. It. Not.* p. 239 (No. 312), p. 243 (No. 364) et p. 365 (No. 7).

Hab. Affghanistan, Otipore! etc., *Griffith*; Kashmir, alt. 5000–6000 ped.! *T.T., Winterbottom.* (fl. April.) (v.v.)

Distr. Europa! Asia minor! Syria! Siberia Uralensis! Persia!

§ 2. *Aizopsis.* Radix valida, multiceps; foliis rosulatis, rigidiusculis, ciliatis, costa subtus valide prominente. Flores albi v. aurei.

2. D. HYSTRIX (*H.f. & T.*). Tota setis patentibus albis hispida, rhizomate crassissimo multicipiti, collo foliorum costis spinescentibus horrido, foliis rigidulis anguste linearibus, scapo aphyllo brevi pedicellisque hispidissimis, floribus majusculis albis?—*Griff. It. Not.* p. 257 (No. 478).

Hab. In Affghanistan ad summum portarum Koshuk Pass, alt. 7300 ped.! *Griffith.*

Species valde singularis *D. Aizoidi* affinis, sed floribus albis.—*Rhizoma* perpendiculare, divisum, crassit. digiti minoris, inferne crebre cicatricatum, superne fasciculo densissimo spinarum 1″ long. e foliorum delapsorum costis persistentibus formato terminatum. *Folia* subpollicaria, $\frac{1}{12}$″ lat. *Scapi* robusti. *Flores* albi. *Sepala* late oblonga. *Petala* ovata, unguiculata. *Filamenta* gracilia. *Antheræ* breves. *Ovarium* lineari-oblongum, hispidissimum, stylo recto elongato, ovulis ovatis paucis.

3. D. GLACIALIS, *Adams* (*Hook. Fl. Bor. Am.* i. 57). Foliis rigidis linearibus setoso-ciliatis, scapis nudis floribusque aureis subcapitatis glaberrimis, siliquis racemosis glaberrimis pedicellis longioribus tortis lanceolatisve acutis, stylo distincto.

α. Siliqua ovato-lanceolata v. lanceolata.

β. Siliqua ovata.

Hab. In Tibetia occidentali alpina et in Kunawar! alt. 10000–15000 ped. *Herb. Royle, Jacquemont.* (fl. Jun.–Aug.) (v.v.)

Distr. Siberia et America arctica! in Montibus Scopulosis!

Mera forma *D. alpinæ* foliis rigidioribus angustioribus.

In the 'Flora Boreali-Americana' these leaves are stated never to be ciliated; but they become so in specimens from all countries.

§ 2. *Chrysodraba.* Radix valida, multiceps. Folia non rigida, rosulata, coriacea membranaceave, setosa tomentosave, costa subtus non prominente. Flores aurei.

4. D. ELATA (*H. f. & T.*). Pedalis, stellatim pilosula, foliis radicalibus membranaceis petiolatis spathulatis obtusis subintegerrimis, caulinis sessilibus lineari-oblongis dentatis, floribus subcapitatis, pedicellis sepalis ovariisque pubescentibus, siliquis tortis longe racemosis pedicellis elongatis brevioribus ovato- v. oblongo-lanceolatis glabratis acutis, stylo brevi distincto.

Hab. In Himalaya orientali subalpina, alt. 11000–13000 ped.! *J.D.H.* (fl. Jul.) (v.v.)

Laxe cæspitosa. *Caules* simplices. *Flores* majusculi, pedicellis inferioribus sæpe bracteatis. *Siliculæ* vetustiores bis terve tortæ, $\frac{1}{2}$–$\frac{3}{4}$″ long. *Valvæ* planæ.—An forma gigantea *D. alpinæ*?

5. D. ALPINA (*Linn.*). Foliis dense rosulatis oblongis obovato-spathulatis lanceolatisve pilosis ciliatisve pilis ramosis simplicibusque, scapis aphyllis, floribus subcapitatis, siliquis racemosis glabris ellipticis oblongisve stylo breviusculo.—An *D. radicans*, Royle, Ill. p. 71?

D. glacialis, Kar. & Kir. Plant. Alatau, No. 1208 (vix Adams), variat foliis densius laxiusve rosulatis, $\frac{1}{4}$–1″ long., acutis obtusisve, scapis (rarissime 1-foliatis) pedicellisque pubescenti-pilosis glaberrimisve, 1–10-floris, foliis vix longioribus ad 10″ long.

Hab. In Affghanistan! *Griffith*; Himalaya alpina tota! et Tibetia occidentali alpina! alt. 12000–17000 ped. copiosiss. (fl. Mai–Jul.) (v.v.)

Distr. Norwegia! Lapponia! Siberia, mont. Altai et Ural; Soongaria! America arctica! Montibusque Scopulosis!

An excessively variable plant, of which *D. glacialis* is a drier-country form; it abounds in all Arctic America, and is found in Norway, but not in Central Europe or the Pyrenees. It clearly resembles an Asia Minor species of Boissier, *D. elegans*; and, I think, *D. incompta*, Stev., and *D. polytricha*, Led., Caucasus, and *D. algida*, *Adamsii*, and *ochroleuca* of Siberia, may all be referred to it. In the 'Flora Boreali-Americana' it is stated to vary with white flowers; and this, I think, is also the case in the Sikkim Himalaya, where it is impossible to distinguish forms of it from *D. Wahlenbergii*, Hartm.

§ 3. *Leucodraba* et *Holarges*. Radix biennis v. perennis, multiceps. Folia mollia, plana, nec rigida nec carinata. Flores albi.

6. D. INCANA (*Linn.*). Tota pilis simplicibus stellatisque cano-tomentosa, scapis gracilibus foliosis simplicibus, foliis oblongis lanceolatis spathulato-lanceolatisve acutis dentatis v. integerrimis, siliquis ellipticis lanceolatisve acutis incanis pedicello longioribus.—Descript. ad exempl. Himalaica.

Hab. In Himalaya alpina tota, alt. 10000–17000 ped.! et Tibetia occidentali frequentissime! (fl. Mai.–Jun.) (v.v.)

Distr. Europa tota arctica! et alpina! America boreali arctica! alpina! et antarctica! Asia boreali! et arctica!

The pods are always small and hoary in the Himalayan forms, are racemose and elliptic or lanceolate, always longer than the pedicels.

7. D. LASIOPHYLLA (*Royle, Ill.* p. 71). Omnibus *D. incanæ* sed magis conferta, scapis brevioribus gracilioribus sæpius minus foliosis, foliis molliter incano-tomentosis albis, siliquis brevioribus latioribus.

D. glomerata, *Royle, l. c.*

Hab. In Himalaya occidentali alpina, alt. 12000–16000 ped.; Kunawur! *Royle, Jacq.*; Kumaon! et Garwhal! *Strachey & Winterbottom*; et Tibetia occidentali alpina, alt. 15000–18000 ped.! *T. T.*, et orientali, alt. 17000 ped.! *J. D. H.* (fl. vere.) (v.v.)

An vere ab *D. stellata*, DC., distincta? Exemplaria siliquis capitatim confertis ad *D. Wahlenbergii* tendunt.

8. D. WAHLENBERGII (*Hart. Scand.* ed. 2, p. 177, *fid. Led. Fl. Ross.* i. p. 150). Parvula, foliis glabris pilosisve lanceolatis, scapo tenui nudo v. 1-phyllo, siliquis parvis ellipticis capitatim confertis glabris ellipticis v. lineari-lanceolatis, pedicellis patentibus, stylo brevissimo.

α. *homotricha*, Led. *l. c.* Foliis pectinato-ciliatis utrinque pilosis v. glabris, pilis omnibus simplicibus.—*D. lactea*, Kar. & Kir.! En. Pl. Soong. no. 80; Led. *l. c.* p. 755.

β. *heterotricha*, Led. *l. c.* Foliis ciliatis, utrinque pilosis, pilis aliis elongatis simplicibus, aliis brevioribus stellatis.—*D. pygmæa*, Turc.!

Hab. In Kunawur et Tibetia occidentali alpina.—Var. *a*, in Piti! et Nubra! alt. 15000–18000 ped., *T. T.*; var. *β*, Nubra! et Zanskar! alt. 13000–17000 ped., *T.T.* (fl. Sept.) (v.v.)

Distr. In alpibus Siberiæ! terrisque arcticis Europæ! Asiæ! et Americæ!

Best distinguished by the small, tufted habit, lanceolate, ciliate or pilose (not white tomentose) foliage, shortish, slender, leafless scapes, and subcapitate racemes of small, broad, acute pods. It approaches some Arctic American forms and *D. rupestris* of Britain, but is hardly identical. The var. *a* exactly accords with Karelin's and Kiriloff's specimens.

9. D. ARMENA (*Boiss.*? *Ann. Sc. Nat.* sér. 2, vol. xvii. p. 167). Parvula, cæspitosa, tota cano-tomentosa, foliis spathulatis v. obovato-lanceolatis, scapis nudis paucifloris, siliquis ellipticis acutis non tortis cano-tomentosis pedicellis longioribus stylo brevi apiculatis.

Hab. In Affghanistan, Kohi Baba, alt. 14000–15000 ped.! *Griffith.*

D. Wahlenbergii affinis, differt tomento foliorum cano et siliquis cano-tomentosis.

10. D. TIBETICA (*H. f.* & *T*). Laxe cæspitosa, molliter cano-tomentosa v. lanuginosa, foliis spathulato-lanceolatis acutis integerrimis, scapis elongatis gracilibus nudis, pedicellis elongatis, sepalisque canis, floribus magnis, siliquis elliptico- v. lineari-lanceolatis planis tortisve cano-tomentosis glaberrimisve, pedicellis gracilibus brevioribus, stylo breviusculo.

Var. *a*. *Thomsoni*. Foliis cano-tomentosis, siliquis planis, stylo brevi.—Ad *D. lasiophyllam* tendit.

Var. *β*. *Sikkimensis*. Foliis lanuginosis, siliquis tortis, stylo valido elongato.—Ad *D. incanam* tendit.

Var. *γ*. *Winterbottomi*. Foliis appresse cano-lanuginosis, siliquis lineari-lanceolatis angustioribus planis glabris, stylo brevi gracili.—Ad *D. Wahlenbergii* siliquis tendit.

Hab. *a*, in Tibetia occidentali alpina, Zanskar, alt. 13000–15000 ped.! *T.T.* *β*, in Tibetia occidentali, alt. 14000–16000 ped.! *J. D. H.* (fl. Jun.-Jul.) (v.v.) *γ*, in Tibetia occidentali, Balti ad Deotsa et Takhala, alt. 11000–13000 ped.! *Winterbottom.*

Caules interdum graciles, elongati. *Folia* ½–1″ long. *Scapi* spithamæi, rarius unifoliati. *Flores* albi (v. interdum lutei, *T. T.*), ¼″ lati. *Siliquæ* erectæ; pedicellis suberectis, ⅓–1″ long.

I have reluctantly brought these three forms under one species, having each from a single small province only of the Himalaya or Tibet. In the aggregate they may best be distinguished by the tufted habit, white, woolly or tomentose, quite entire acute spathulato-lanceolate leaves, almost invariably leafless scapes, long pedicels, and large flowers. The pods present wide variations: they are racemose, tomentose, elliptic-lanceolate, and much shorter than the pedicels in *a* and *β* (twisted, with long stout styles in *β*; flat, with short styles in *a*), but longer, narrower, quite glabrous, and almost capitate in *γ*. All the specimens from each locality agree perfectly;

and extensive suites from other localities are wanted to determine positively how far the three varieties are permanently distinct forms from one another and from *D. lasiophylla, Wahlenbergii,* and *incana. D. Armena* has much smaller, shorter pods, and stout pedicels. Thomson remarks that the flowers are both white and yellow. Mr. Winterbottom's specimens (var. γ) clearly resemble Boissier's *D. Persica.*

§ 4. *Drabella.* Annua. Caulis seu scapus foliosus. Flores albi v. flavi.

11. D. GRACILLIMA (*H. f. & T.*). Annua, stellatim puberula, caulibus filiformibus diffusis flexuosis, foliis radicalibus spathulatis subdentatis, caulinis sessilibus, floribus parvis flavis, siliquis glabris longe racemosis gracillime pedicellatis linearibus utrinque acutis, stylo nullo.

Hab. In Himalaya occidentali temperata, Sikkim, alt. 10000–11000 ped.! *J. D. H.* (fl. Jun.) (v.v.)

Radix gracilis. *Caules* perplurimi, flexuosi, spithamæi et ultra. *Folia* laxe rosulata, membranacea, $\frac{1}{3}$–$\frac{3}{4}''$ long. *Siliquæ* rectæ v. curvæ, $\frac{1}{2}''$ long., $\frac{1}{8}$–$\frac{1}{10}''$ latæ, secus totum caulem racemosæ; valvis planiusculis, membranaceis, septo completo. *Semina* plurima, 2-seriata, septo dimidio angustiora, funiculis brevibus arcuatis, testa granulata v. subechinulata.

12. D. ELLIPSOIDEA (*H. f. & T.*). Annua, furcatim pilosa v. setulosa, subcæspitosa, ramis brevibus, foliis lineari- v. lanceolato-oblongis dentatis, scapis perbrevibus pedicellisque stellatim pubescentibus, floribus minimis albis, siliquis pedicellis æquilongis exacte elliptico-oblongis utrinque obtusis compressissimis, stylo 0.

Hab. In Himalaya orientali alpina, Sikkim, cultis alt. 15000 ped.! *J. D. H.* (fl. Sept.) (v.v.)

Species humilis, depressa, semel tantum visa, in agris raphanorum a Tibetanis per menses tres æstatis autumnique cultis.—Tota laxe pilosula. *Caules* perplurimi, 1–2-pollicares, inter se cæspitem formantes. *Folia* pauca, $\frac{1}{3}$–$\frac{3}{4}''$ long. *Racemi* fructiferi breves. *Pedicelli* curvi. *Siliquæ* $\frac{1}{5}$–$\frac{1}{4}''$ longæ; valvæ planæ v. imo depressæ, stellatim puberulæ, reticulatim venosæ, interdum obscure tortæ. *Septum* completum. *Semina* parva, obovato-oblonga, funiculo brevi arcuato. Siliquæ *D. Huetii,* Boiss. & Reut. (*Armeriæ*), sed habitus diversissimus.—An *D. nemoralis* forma?

13. D. STENOCARPA (*H. f. & T.*). Annua, elata, erecta, inferne hispido-pilosa, pilis elongatis patulis simplicibus et furcatis, foliis radicalibus stellatis lineari-oblongis obtusis integerrimis v. obscure dentatis, caulinis similibus paucis, scapo v. caule simplici v. diviso gracili superne glabro, pedicellis gracilibus, floribus majusculis, siliquis pedicellis patentibus erectis anguste lineari-elongatis setulosis.

Hab. In Tibetia occidentali temperata ad Das Kirim! *Winterbottom.* (fl. Jul.) (v.s.)

Habitu *D. nemoralis,* sed pilis longioribus rigidioribus, floribus majoribus siliquisque multo longioribus angustioribusque. *D. lineari,* Boiss.

(e Persia), proxima (an ejus forma?), sed multo major siliquis longius pedicellatis setulosis. *Siliquæ* $\frac{1}{2}''$ long., $\frac{1}{10}''$ lat.; valvis medio depressis. *Semina* plurima, parva, funiculis brevibus.

Draba radicans, Royle Ill. p. 71, appears hardly to belong to this genus; it is but slightly hairy, and has a very long style to the ovary: it is not in fruit.

Strachey and Winterbottom's *Draba* No. 11 is possibly a *Thlaspi*; it is from Pindari, alt. 11500 ped.: 3, 4, and 12 are *Iberidella Andersoni,* nob.

15. Cochlearia, *L.*

1. C. flava (*Ham. Hort. Bengal.* p. 48). Annua, ramosa, foliis lanceolatis pinnatifido-lobatis lobulis dentatis incisisve, racemis elongatis, floribus parvis, siliqua globosa, valvis subenervibus septo completo, seminibus numerosis parvis funiculis longissimis.—*Hook. Ic. Pl.* t. 805.

C. alyssoides, *DC. Prodr.* i. p. 171.—Alyssum cochlearioides, *Roth, Nov. Pl. Sp.* p. 322.—Camelina Caisir, *Wall. Cat.* 4802.

Hab. In planitie Gangetica inferiore et superiore, a flum. Soane! ad Moradabad! (fl. Mar.) (v.v.)

2. C. Himalaica (*H. f. & T.*). Pusilla, glaberrima, ramis gracilibus prostratis, foliis longe petiolatis oblongo-ovatis repando-crenatis, floribus parvis sepalis siliquisque sparse pilosis, siliqua elliptica curva compressa 3–5-sperma, stylo subgracili, septo evanido, valvis ecostatis venis paucis vage ramosis.

Hab. In Himalaya orientali alpina; Sikkim interiore! alt. 13000–16000 ped., *J. D. H.* (fl. Jun.) (v.v.)

Taphrosperma Altaico subsimilis, sed differt forma siliquæ embryoneque pleurorhizo.—*Radix* gracilis, perennis? *Rami* graciles. *Folia* 2–4 lin. longa, patula. *Sepala* persistentia. *Siliquæ* cum stylo $\frac{2}{10}''$ long.; replum intus alatum (septo rudimentario). *Semina* 2-serialia.

3. C. scapiflora (*H. f. & T.*). Pusilla, acaulis, glaberrima, radice crassa, foliis lineari-lanceolatis spathulatisve subdentatis, scapis unifloris, siliqua glaberrima oblique elliptico-oblonga compressa, 1–4-sperma, stylo crasso, septo evanido, valvis ecostatis, venis paucis vage ramosis.

Hab. In Himalaya orientali alpina, Sikkim interiore, alt. 15000–17000 ped.! *J. D. H.*; Tibetia occidentali alpina, Gugi, 15500 ped.! *Str. & Wint.*; Ladak! Nubra! et Pangong! alt. 16000–18000 ped., *H. Strachey, T. T.* (fl. Jul.) (v.v.)

C. Himalaicæ affinis, sed habitu valde diversa. *Radix* pro planta maxima, interdum crassit. digiti minoris. *Folia* 1–2″ long. *Flores* pallide lilacini.

16. Tetracme, *Bunge.*

1. T. recurvata (*Bunge, Plant. Lehman.* p. 33). Foliis lineari-oblongis

lanceolatisve sinuato-v. runcinato-dentatis, siliquis longe spicatis primo erectis apice decurvo, cornubus elongatis recurvis.

Hab. In Affghanistan glareosis frequens! *Griffith*; Beluchistan! *Stocks.*
Distr. Prov. Caspian.!

2. T. SECUNDA (*Boiss. Diagn.* sér. 2, No. i. p. 29). Annua, hispidula, depressa, foliis oblongo-spathulatis petiolatis subintegris, floribus brevissime racemosis, racemis axillaribus terminalibusque fructiferis secundis curvis, siliquis brevibus crassis truncatis imbricatis strictiusculis, valvis apices versus in cornua 2 brevia compressa productis, pedicello curvo.

Hab. In Affghanistan glareosis prope Dai-hag! *Griffith.*

17. MALCOLMIA, *Br.*

§ 1. *Semina 1-seriata.*

1. M. AFRICANA, *Br.* (*Led. Fl. Ross.* i. p. 170). Annua, pilis simplicibus furcatisve setulosa, foliis subdentatis, pedicellis brevibus v. 0, petalis angustis, siliquis furcatim pilosis tomentosisque strictis angustis elongatis 2–5″ long. æqualibus.

β. stenopetala, Claus. (fid. Led. Fl. Ross. *l. c.*!). Setulis simplicibus furcatisque hispida, floribus minoribus.—*M. stenopetala,* Led. *l. c.*

Hab. Panjab! *T. T.*; Himalaya occidentali tropica, alt. 5000-7000 ped. ad Kashmir! et temperata! Tibetia occidentali temperata, 10000-13000 ped.! Affghanistan, 12000 ped.! (*a* et *β*), et Beluchistan! *Griffith, Stocks.*

Distr. Soongaria! Caspia! Persia! Arabia! Syria! Algeria! Hispania! Sardinia! Tauria!

Variat insigniter hirsutie, longitudine et crassitie siliquæ et pedicellorum. *Flores* albi v. purpurei.

2. M. CIRCINATA (*H. f. & T.*). Erecta, ramosa, patentim pilosa v. glabrata, foliis lanceolatis dentatis, floribus breve pedicellatis, petalis angustis elongatis, siliquis tenuibus teretibus elongatis pilosulis erectis supra medium circinatis.

Dontostemon grandiflorus, *Bunge*! *Beitrag zur Kenntn. Flor. Russlands,* p. 25.

Hab. In Affghanistan! *Griffith*; Beluchistan ad Gurghina! *Stocks.*
Distr. Reg. Caspian.!

The stamens are, in some specimens, all free; in others, from the same raceme, the longer filaments are more or less united in pairs. The species may at once be recognized by the very slender erect pods, which are coiled inwards like a crosier above the middle.

§ 2. *Semina basin versus siliquæ 2-seriata.* Strigosella, *Boiss.*

3. M. STRIGOSA (*Boiss. Ann. Sc. Nat.* sér. 2, xvii. p. 70). Annua, prostrata, pilis furcatis hispido-pilosa, foliis runcinato-dentatis pinnatifi-

disve, floribus sessilibus, petalis lineari-elongatis tortis, siliquis curvis 1″ long. hispidissimis tereti-subulatis acuminatis basi incrassatis, seminibus longe funiculatis basi siliquæ 2-seriatis.

Hab. In Beluchistan! *Stocks*; Affghanistan! *Griffith*; ad Peshawur! *Vicary*; Panjab ad Salt Range! *Fleming.* (fl. vere.)

Distr. Persia!

4. M. CABULICA, *H. f. & T.* (Strigosella cabulica, *Boiss. Diagn.* sér. 2, No. 1, p. 22). Annua, prostrata, pilis furcatis patentim hispido-setosa, foliis runcinato- v. pinnatifido-dentatis, floribus subsessilibus, petalis lineari-elongatis tortis, siliquis brevibus $\frac{1}{4}$–$\frac{1}{2}$″ long. curvis subulatis rostratis patentim hispidissimis.

Hab. In Affghanistan glareosis ad Pushut! et rupibus ad Erak! alt. 12000 ped.! *Griffith.*

A priore differt solummodo siliquis brevibus.

18. LEPIDOSTEMON, *H. f. & T.*

1. L. PEDUNCULOSUS (*H. f. & T.*).

Hab. In Himalaya orientali alpina, Sikkim interiore, alt. 14000–16000 ped., *J. D. H.* (fl. Jul.) (v.v.)

A remarkable little plant, found on rocky hills above the village of Tungu, in the interior of Sikkim, which we are quite unable to refer to any described genus. The habit is somewhat Alyssoid; the leaves numerous, toothed, crowded, and lanceolate-spathulate. The flowers almost corymbose, on long peduncles; the calyx erect; petals short, yellow; and siliqua (immature) linear and downy.

19. SISYMBRIUM, *L.*

Many of the species of this genus are with difficulty distinguishable from *Arabis.*

§ 1. *Siliquæ teretiusculæ. Folia pinnatisecta, caulina non cordato-amplexicaulia. Herbæ pleræque elatæ.*

1. S. LŒSELII (*Linn.*). Elatum, erectum, ramosum, pilis simplicibus reversis hispidum v. glabratum, foliis petiolatis sublyrato-runcinatis dentatisve, laciniis basi exauriculatis, floribus majusculis pedicellum æquantibus, siliquis suberectis lente curvis 1–1$\frac{1}{2}$″ long. gracile pedicellatis, junioribus racemo brevioribus, valvis 3-nervibus ad stigma non productis, stylo distincto sub $\frac{1}{2}$ lin. long.

Hab. In Affghanistan arvis prope Ghuznee, &c., alt. 8000–12000 ped.! *Griffith*; Himalaya occidentali temperata, ad Kashmir, alt. 5000–7000 ped.! *T. T.* (fl. April.) (v.v.)

Distr. Soongaria! Europa borealis! et media! Persia! Syria! Asia minor!

The reversed hairs on the lower part of the stem, runcinate pinnatifid leaves, large yellow flowers, long young pods which do not overtop the raceme, and slender terete pods, 1–1¼" long, with a distinct straight style, best distinguish this.

2. S. Irio (*Linn.*). Glaberrimum, elatum, foliis runcinato-pinnatipartitis laciniis exauriculatis, siliquis patulis gracile pedicellatis 1¼–2" long., valvis 3-nerviis ad stigma obtusum productis, stylo 0.

S. subhastatum, *Edgew.*! *in Hb. Benth.*

Hab. Beluchistan! *Stocks*; Panjab! *Jacquemont, &c.*

Distr. Europa! ins. Canariens.! Africa borealis! Syria! Asia minor!

Some of the Panjab specimens have a very few hairs at the base of the stem.

3. S. irioides (*Boiss. in Ann. Sc. Nat.* sér. 2, xvii. p. 76). Erectum, glabrum v. basin versus hispido-pilosum, foliis etc. ut in *S. Irione*, sed siliquis stylo distincto terminatis, valvis non ad stigma productis.

Hab. In Affghanistan! *Griffith*; Panjab, copiose! *T. T.*; cultis ad Ajmir! *Jacquemont.* (fl. hieme.) (v.v.)

Distr. Mesopotamia.

I have not seen authentic specimens of this, which Boissier describes as having flowers twice as large as those of *S. Irio.* Such is not the case in our specimens; but they are sometimes very small, and always variable in size, both in this and in *S. Irio*: the style varies so much also in length, that we should not be surprised if the two species were found to pass into one.

4. S. Pannonicum (*Jacq. Coll.* i. p. 70). Plerumque divaricatim ramosum, hispidulum v. glabratum, foliis runcinato-pinnatipartitis laciniis conformibus, caulinis supremis angustis, sepalis patentibus, siliquis strictis patentibus 3–4" long., pedicello crasso, stylo subelongato, valvis convexis, nervis 3, mediano crasso.

Hab. In Tibetia occidentali temperata ad prov. Hasora! *Winterbottom.* (fl. Jun.–Jul.)

Distr. Soongaria! Persia! reg. Caspian.! Arabia! Asia minor! Hungaria! Germania! Rossia!

5. S. Columnæ (*Linn.*). Erectum, glaucescens, glaberrimum v. hispido-pilosum, foliis runcinato-pinnatipartitis, terminali angulato, supremis sæpe hastatis, sepalis erectis, siliquis curvis patentibus 3–4" long., pedicello crasso, stylo subelongato, valvis convexis striatis non costatis.

Hab. In Tibetia occidentali temperata et subalpina, Gugi, alt. 13500 ped.! *Str. & Wint.*; Piti! Kunawur! et per totam Ladak! Nubra! Zanskar! etc., alt. 9000–14000 ped., *T. T.*; et in Himalaya temperata occidentali ad Kumaon, 10000 ped.! *Edgew.*; Kishtwar! *T. T.*; Affghanistan, *Griffith.* (fl. vere.) (v.v.)

Distr. Asia central.! Asia minor! Austria! Hispania!

We have (following Edgeworth) referred the common tall West Himalayan and Tibetan *Sisymbrium* with runcinate leaves to *S. Columnæ*, L.

It is an extremely variable plant, being generally glabrous, but sometimes hispidly hairy, and, from being often browsed by cattle, the specimens assume very abnormal forms, the leaves being sometimes entire, and the branches very short. Griffith's Affghanistan specimens are in a very bad state; they are much larger, with almost entire leaves.

6. S. WALLICHII, *H. f. & T.* (Arabis? leptocarpa, *Wall. Cat.* 4784!). Tota basi hispido-pilosum, ramis gracilibus, foliis brevibus, radicalibus runcinato-lobatis v. pinnatisectis lobo terminali majore, caulinis pinnatifidis, floribus parvis, pedicellis gracillimis ½″ long., sepalis patentibus, siliquis patulis v. decurvis gracillimis 3″ long., stylo brevi, valvis convexis, nervo medio valido.

Arabis gracilis, *Herb. Royle.*

Hab. In Himalaya occidentali temperata, Kumaon, alt. 5000–7000 ped.! *Blinkworth, Str. & Wint.*; Kashmir et Kishtwar! et Chamba, alt. 5000–7000 ped.! *T. T.*; Affghanistan, alt. 7000 ped.! *Griffith.* (fl. Mar.–Apr.) (v.v.)

The small radical leaves, very slender long pods, and filiform long pedicels are the best marks of this species. Thomson's Kashmir specimens have more deeply and regularly cut leaves than the Kumaon ones.

7. S. RIGIDULUM (*Dcne. Ann. Sc. Nat.* iii. p. 272). Humile, caulibus ascendentibus, parce hispido-pilosum v. glabratum, foliis radicalibus segmentis subdentatis, caulinis varie sectis, racemis paucifloris, floribus magnis, sepalis patulis, siliquis patulis validis elongatis crasse pedicellatis 2–3″ long., stylo crassiusculo, valvis convexis nervo medio valido.

Hab. In Beluchistan ad Nichara! *Stocks*; Affghanistan rupibus ad flum. Koonur! *Griffith*; montibus Khyber! *Vicary.*

Distr. Persia! Syria!

S. Pannonico et *Columnæ* valde affine, differt statura humiliore, floribus majoribus, caulibus brevibus ascendentibus.

8. S. SOPHIA (*Linn.*). Erectum, glaberrimum, pubescens v. incano-tomentosum, foliis omnibus bi- tripinnatisectis segmentis angustis, pedicellis gracilibus floribus longioribus, racemis elongatis, petalis calycem æquantibus, siliquis erecto-patentibus gracile pedicellatis curvis 1″ long., valvis nervo medio valido ad stigma parvum productis, stylo 0.

β. Schimperi. Parvula, canescens, racemo paucifloro.—*S. Schimperi*, Boiss. Ann. Sc. Nat. xvii. p. 76.

Hab. Affghanistan, alt. 9000–10000 ped.! *Griffith*; Beluchistan! *Stocks*; in Himalaya occidentali temperata, alt. 5000–7000 ped.! et Tibetia occidentali, alt. 9000–14000 ped.! (fl. vere.) (v.v.) *β.* Affghanistan, alt. 6000–10000 ped.! *Griffith.*

Distr. Persia! Syria! Asia minor! Siberia! Europ. temp. et arctica! Am. boreal. temp. et subarctica!

9. S. MINUTIFLORUM (*H. f. & T.*). Annuum, stellatim puberulum, caulibus tenuibus ramosissimis, foliis parvis in segmenta linearia varie

sectis, floribus albis minimis, siliquis pedicellatis parvis angustis (⅛″ long.) teretiusculis obtusis, stigmate sessili, valvis subenerviis.

Hab. In Affghanistan glareosis ad portum Erak, alt. 9500–11000 ped.! *Griffith*; Tibetia occidentali, prov. Zanskar! *T. T.* (fl. Jun.) (v.v.)

A very minute and slender annual, with almost microscopic white flowers.

§ 2. *Siliquæ lineares, planiusculæ.*—Herbæ annuæ, glaberrimæ. Folia integerrima, caulina cordato-amplexicaulia.

10. S. PLANISILIQUUM, *H.f. & T.* (Erysimum, *Led. Fl. Ross.* i. p. 192.—Conringia, *Fisch. & Mey.*). Erectum, gracile, glaberrimum, glaucescens, foliis integerrimis, radicalibus petiolatis lineari-oblongis, caulinis oblongis obtusis basi profunde cordato-bilobis, siliquis anguste linearibus gracile pedicellatis 3–4″ long., stylo gracili, valvis planiusculis torulosis enerviis.

Hab. In Tibetia occidentali temperata, alt. 10000–14000 ped., Zanskar! Ladak! Nubra! *T. T.* (fl. Jun.) (v.v.)

Distr. Soongaria! Armenia!

Habitus *Turritidis*; siliquæ *Arabidis*; folia *Conringiæ*; embryo inter *Brassicam* et *Sisymbrium*.

11. S. SALSUGINEUM (*Pall.*; *Led. Fl. Ross.* i. p. 185). Parvulum, glaberrimum, glaucum, caule erecto subsimplici v. ramoso tenui, foliis radicalibus spathulatis, caulinis cordato-amplexicaulibus integerrimis, floribus parvis, siliquis erecto-patulis linearibus glabris.—Cf. *Conringia Persica*, Boiss.

Hab. Affghanistan ad portum Koshuk, alt. 6000–7000 ped.! *Griffith.*

Distr. Siberia altaica! America occident. arctica.

§ 3. *Siliquæ variæ, pleræque planiusculæ.*—Herbæ (rarius perennes) annuæ, pilosæ v. hispidæ, v. canæ glaberrimæ (in *S. mollissimo*, var. β). Folia radicalia non lyrato-pinnatifida; caulina basi amplexicaulia, sagittata v. cordata.

12. S. PUMILUM (*Stephan. ex Led. Fl. Ross.* i. p. 181). Erectum, stellatim pubescens, caule simpliciusculo v. ramoso gracili, foliis inferioribus obovato-lanceolatis subdentatis pinnatifidisve, caulinis oblongis sagittato-amplexicaulibus, floribus parvis, pedicellis sepalis ovariisque pubescentibus, siliquis gracile pedicellatis 1″ long. sparse puberulis curvis, stylo distincto brevissimo, valvis tenuiter 1-nerviis.

Hab. In Affghanistan cultis incultisque alt. 6000–10000 ped.! *Griffith*; Beluchistan! *Stocks.*

Distr. Persia! Arabia! Syria! reg. Caspian.! Asia minor!

Variat statura 4–18″ alt., caule simplici v. ramoso, foliis subintegerrimis v. pinnatifido-lobulatis.

13. S. GRIFFITHIANUM (*Boiss. Diagn.* sér. 2, No. 1, p. 23). Annuum, stellatim pubescens, caule simpliciusculo, foliis radicalibus oblongis obtusis petiolatis subdentatis, caulinis lanceolatis sagittato-amplexi-

caulibus, floribus parvis, sepalis pedicellis ovariisque pubescentibus, siliquis deflexis breve pedicellatis $\frac{2}{3}''$ long. gracilibus falcatis, stylo brevi distincto, valvis stellatim puberulis, 1-nerviis.

Hab. In Affghanistan ad Hydogil arenosis! *Griffith.*

S. pumilo valde affine, differt statura humiliore, pedicellis brevioribus et siliquis falcatis deflexis.

Boissier quotes Griffith's No. 1481 for this plant, which number should belong to *S. pumilum.*

14. S. MOLLISSIMUM (*C. A. Meyer*; *Led. Fl. Ross.* i. p. 185). Pilis simplicibus pubeque stellata incano-tomentosum (in var. β glaberrimum), caule erecto stricto rigido simplici v. ramoso, foliis dentatis v. integerrimis, radicalibus petiolatis obovato-lanceolatis, caulinis oblongis sagittato-amplexicaulibus, floribus capitatis purpureis, ovariis glaberrimis, siliquis glaberrimis gracile pedicellatis erectis 1–$1\frac{1}{4}''$ long. gracilibus, stylo brevi, valvis convexis subenerviis.

β. *glaberrima.* Tota glaberrima v. basi tantum pilosula.

Hab. In Himalaya occidentali temperata et alpina, a Kashmir! ad Kumaon! alt. 9000–12000 ped. frequens, *Jacquemont, &c.*; Sikkim, alt. 15000ped.! *J.D.H.*; in Tibetia occidentali temperata, alt. 12000–14000 ped.! ad Astore! *Winterbottom*; Gugi! *Str. & Wint.*; Ladak! *T. T.* (fl. vere.) (v.v.) Var. β. Kishtwar! et Zanskar! *T. T.*

Distr. Siberia altaica!

15. S. HIMALAICUM *H. f. & T.* (Arabis Himalaica, *Edgew. in Linn. Trans.* xx. p. 31). Hispido-tomentosum v. pilis simplicibus sparsis et pube stellata plus minusve indutum, caulibus rigidis simplicibus strictis v. divaricatim ramosis, foliis sinuato-dentatis, radicalibus petiolatis, caulinis oblongis dentatis sagittato-amplexicaulibus, pedicellis brevibus validis foliaceo-bracteatis, siliquis strictis teretibus glaberrimis stellatim puberulis erectis v. divaricatis $\frac{1}{2}$–$\frac{3}{4}''$ longis, valvis tenuiter 1-nerviis, stylo brevi.

Hab. In Himalaya temperata orientali, Sikkim! alt. 10000–12000 ped., *J.D.H.*; et occidentali, Garwhal! et Kumaon! alt. 10000–12000 ped., *Edgeworth, Str. & Wint.* (fl. vere.) (v.v.)

S. mollissimo interdum simillimum, sed differt conspicue pedicellis brevioribus et robustioribus, siliquis brevioribus strictioribus, et præcipue racemo per totam fere longitudinem foliis parvis dentatis bracteato. Ab *S. rupestri*, Edgew., differt præcipue foliis caulinis basi sagittato-cordatis.

16. S. FOLIOSUM (*H. f. & T.*). Suberectum, diffuse ramosum, sparse stellatim pilosum, foliis amplis, radicalibus (paucis v. 0) petiolatis spathulatis dentatis, caulinis oblongis acutis grosse dentatis basi longe sagittato-amplexicaulibus lobis porrectis, racemo glabrato ebracteato, floribus parvis, siliquis glaberrimis erecto-patentibus gracilibus curvis 1″ long., valvis planiusculis, costa tenui, stylo brevi.

Arabis foliosa, *Herb. Royle.*

Hab. In Himalaya occidentali temperata, Kashmir, alt. 5000–7000 ped.! *T. T.* (fl. April.) (v.v.)

Inter *S. pumilum* et *S. mollissimum* medium; a priore differt siliquis glaberrimis, a posteriore siliquis curvis brevius pedicellatis, ab utroque foliis multo majoribus lobis basi longe productis. A varietate gigantea foliosa *S. pumili* (Plant. Auch. Eloy, 94, Aleppo, & Plant. Gaillardot Syriæ, 1553 C.) differt solummodo siliquis glaberrimis.

17. S. Cabulicum (*H. f. & T.*). Annuum, ramosissimum, sparse stellatim pubescens, ramis ascendentibus, foliis caulinis e basi lata oblongo-lanceolatis acutis subintegerrimis basi hastato-amplexicaulibus, floribus parvis, racemis ebracteatis, siliquis breviusculis curvis ascendentibus ½″ long. puberulis acutis, valvis paulo convexis tenuiter venosis, stylo brevi gracili.

Hab. Affghanistan! *Griffith.*

Species distinctissima, habitu ramosissima, floribus parvis, foliis caulinis subintegerrimis oblongo-lanceolatis basi longe hastatis, et siliquis breviusculis ascendentibus acutis facile distinguenda.

18. S. Thomsoni (*H. f.*). Perenne, e basi ramosum, ramis gracilibus elongatis erectis foliisque inferioribus molliter patentim pilosis superne glabris, foliis subdentatis integerrimisve, radicalibus petiolatis, caulinis e basi lata cordato-sagittata ovato-lanceolatis subacutis, racemis ebracteatis, pedicellis gracilibus flore purpureo 1½ longioribus pubescentibus, siliquis erectis gracilibus strictis glaberrimis 1–1½″ long. compressis, valvis angustis tenuiter costatis, septo enervi, stylo distincto brevi.

Hab. In Tibetia occidentali temperata, Ladak, alt. 12000–13000 ped.! *T. T.* (fl. Jun.) (v.v.)

Species elegans, 1–2-pedalis, habitu *Arabidis*, siliquis strictis erectis gracilibus acutis compressis ab affinibus facile distinguenda. *Septum* enerve. *Semina* minima.

§ 4. *Siliquæ teretiusculæ v. planiusculæ.*—Annuæ, rarius perennes, hispidæ v. glabræ. Folia radicalia non lyrato-pinnatifida v. runcinata; caulina basi non cordata v. amplexicaulia.

19. S. strictum, *H. f. & T.* (Malcolmia, *Camb. in Jacq. Voy.* i. p. 16, t. 16). Annuum, erectum, strictum, rigidum, incano stellatim pubescens, foliis lineari-oblongis sinuato-dentatis, caulinis sessilibus, pedicellis flori purpureo æquilongis sepalisque dense pubescentibus, floribus dense capitatis, ovariis glaberrimis, siliquis gracile pedicellatis erectis curvis 1″ long. teretibus glaberrimis gracilibus, stylo distincto crassiusculo, valvis convexis costa prominula.

Hab. In Himalaya occidentali temperata, alt. 5000–10000 ped., a Kunawur! ad Kumaon! Kashmir! *Winterbottom*; et Tibetia occidentali temperata, ad Hassora! *Winterbottom.* (fl. vere.) (v.v.)

Herba rigida, 1–2-pedalis, *S. mollissimo* habitu floribus siliquisque valde affinis, differt solummodo foliis caulinis non amplexicaulibus. Exemplaria ramosa a sequente vix distinguenda.

20. S. RUPESTRE (*Edgew. in Linn. Trans.* xx. p. 33). Annuum, erectum, ramosum, rigidum, incano stellatim pubescens, foliis lineari-oblongis sinuato-dentatis, caulinis sessilibus interdum basi lata subcordata, pedicellis flore purpureo brevioribus sepalisque dense pubescentibus, floribus laxe congestis, ovariis glaberrimis, siliquis breviuscule pedicellatis, cæterum ut in *S. stricto*.

Hab. In Himalaya occidentali temperata et alpina a Kunawur! ad Simla! frequens, alt. 8000–14000 ped., *Edgeworth, &c.* (fl. Aug.) (v.v.)

Inter *S. strictum* et *S. Himalaicum* quasi medium et verisimiliter cum his omnibus et cum *S. mollissimo* in unam speciem proteam conjungendum. Ab *S. stricto* differt (uti *S. Himalaicum* ab *mollissimo*) caule ramoso, pedicellis brevioribus, floribus paucioribus et laxius aggregatis, et denique racemo interdum bracteato. *Folia* caulina interdum basi cordata evadunt. Exemplaria Royleana manca (*S. Kunawurense*, Royle Herb.) siliquis sparse puberulis gaudent. Exemplar *Edgeworthianum* a nobis in Herb. Bentham visum pessimum est, et vix recognoscendum.

21. S. LASIOCARPUM (*H.f. & T.*). Annuum, erectum, rigidum, tenue, strictum, simplex v. ramosum, pilis stellatis incanum et hispido-tomentellum, foliis parvis sinuato-dentatis, radicalibus obovato-spathulatis breve petiolatis, caulinis obovato-oblongis sessilibus, floribus parvis lilacinis breve pedicellatis, siliquis brevibus strictis erectis teretibus $\frac{1}{2}''$ long. pilis furcatis stellatisque dense pubescentibus, stylo brevissimo, valvarum costa inconspicua.

Hab. In Himalaya orientali temperata, Bhotan ad Panga! et ad vias prope Lamnoo! *Griffith.*

S. stricto proxime affine, differt habitu graciliore, indumento copioso et molli, foliis minoribus, floribus parvis, siliquisque brevibus brevius pedicellatis et dense pubescentibus.

22. S. AXILLARE (*H.f. & T.*). Annuum, parvulum, depressum, ramosum, foliosum, plus minus sparse hispido-pilosum v. tomentosum, ramis prostratis, foliis radicalibus petiolatis spathulatis sinuato-dentatis lobatisve, caulinis sessilibus oblongis, floribus albis, pedicellis foliis caulinis axillaribus gracilibus, siliquis gracillimis glaberrimis 1″ long. subtorulosis, valvis enerviis.

Hab. In Himalaya orientali temperata, Bhotan rupibus murisque ad Chupcha! *Griffith*; Sikkim lapidosis, alt. 8000–10000 ped.! *J. D. H.* (fl. Jun.) (v.v.)

Species distinctissima habitu prostrato, caulibus foliosis, siliquisque gracilibus axillaribus. Exemplaria e Bhotan hirsutiora quam Sikkimensia evadunt.

23. S. HUMILE (*C. A. Meyer, ex Led. Fl. Ross.* i. p. 184). Perenne? humile, glabrum v. pube stellata incano-tomentosum, caulibus diffusis ascendentibus, foliis oblongis sinuato-dentatis lobatis integerrimisve, caulinis petiolatis, floribus breve pedicellatis majusculis albis, siliquis pedicellatis strictis 1–1½″ long. teretibus torulosis, valvis enerviis, stylo brevi.

Hab. In Tibetia occidentali temperata et subalpina, alt. 12000–15000 ped.! *Winterbottom, T. T.* (fl. Jun.) (v.v.)

Distr. Siberia Altaica! America arctica!

Planta plurimis notis *Arabidi petrææ* valde affinis.

24. S. TORULOSUM (*Desf. Fl. Alt.* ii. p. 84, t. 159). Annuum, depressum, ramosissimum, glabrum v. pilis furcatis hispidulum, ramis crassis foliosis ascendentibus, foliis radicalibus oblongo-lanceolatis sinuato-dentatis pinnatifidisve, caulinis petiolatis, floribus parvis, siliquis strictis contortuplicatisve torulosis pedicello brevissimo crasso.

S. torulosum, *Desf.*; *et* contortuplicatum, *DC.*

Hab. Affghanistan! *Griffith*; Beluchistan! *Stocks.*

Distr. Persia! reg. Caspian.! Asia minor! Syria! Algeria!

25. S. THALIANUM, *Gay* (Arabis, *auct.*). Pilosum, annuum, caule erecto stricto gracili, foliis integerrimis dentatisve, radicalibus petiolatis obovatis, caulinis oblongis subsessilibus, floribus parvis albis gracile pedicellatis, siliquis suberectis gracilibus glabris lente curvis compressis, valvis vix nervosis, stylo brevi, seminibus compressis.

Hab. In Himalaya temperata, alt. 5000–10000 ped., Bhotan! *Griffith*; a Kumaon! *Str. & Wint.*, ad Kashmir! *T. T.*; Affghanistan! *Griffith*; Tibetia occidentali, Hasora! *Winterbottom.* (fl. Apr.) (v.v.)

Distr. Europa! et Asia borealis temperata!

§ 5 (*Alliaria*). *Siliquæ teretes.*—Perennes, glaberrimæ, elatæ. Folia omnia indivisa, integra, oblongo-ovata v. reniformi-rotundata.

26. S. ALLIARIA (*Scop.*). Foliis indivisis longe petiolatis, inferioribus reniformi-rotundatis grosse repando-crenatis, superioribus cordato-ovatis acute dentatis, floribus albis, siliquis teretibus patulis robustis pedicello crasso, valvis 3-costatis, seminibus striato-punctatis oblongis.

Hab. In Himalaya occidentali temperata, a Kumaon, alt. 6000–8000 ped.! *Str. & Wint.*, ad Kashmir! *Jacquemont*; Affghanistan! *Griffith.* (fl. Apr.) (v.v.)

Distr. Persia! Asia minor! Europa tota!

27. S. DELTOIDEUM (*H. f. & T.*). Elatum, ramosum, foliis omnibus petiolatis amplis late ovato-deltoideis sinuato-dentatis, siliquis longe pedicellatis suberectis brevibus oligospermis apice attenuatis, valvis medio carinatis, seminibus magnis lineari-oblongis testa lævi.

Hab. In Himalaya orientali temperata, Sikkim, alt. 11000–13000 ped.! *J. D. H.* (fl. Jul.) (v.v.)

There are several other Sisymbrioid plants in the Indian collections which we are unable to dispose of. One, Affghanistan, *Griff.* (1470 & 1472, Hab. non nota) resembles *S. junceum*, but has very long pedicels to the flower, and may be a form of one of those already described.

20. EUTREMA, *Br.*

1. E. HIMALAICUM (*H. f. & T.*). Caule simplici robusto, foliis integerrimis, radicalibus longe petiolatis oblongo- v. ovato-cordatis obtusis, caulinis ovato-oblongis ovato-lanceolatisve obtusiusculis basi sessili semiamplexicauli, floribus majusculis albis capitatim congestis, siliquis longe pedicellatis suberectis brevibus.

Hab. In Himalaya orientali temperata, Sikkim! alt. 10000–13000 ped., *J. D. H.* (fl. Jun.) (v.v.)

Smelowskiæ integrifoliæ (Siberiæ) arcte affine, differt foliis superioribus basi auriculatis.

2. E. PRIMULÆFOLIUM (*H. f. & T.*). Glaberrimum, rhizomate crasso, foliis amplis subserratis, scapis foliis brevioribus foliosis, siliquis crassiusculis curvis $\frac{1}{2}$–$\frac{3}{4}''$ long., valvis enerviis, stylo 0, septo replum marginante.

Sisymbrium primulæfolium, *Thoms. in Hook. Kew Journ. Bot.* iv. t. 10, et v. p. 18.

Hab. In Himalaya occidentali temperata, alt. 6000–11000 ped.! Kashmir! et Simla! *T. T.*; Kumaon! *Str. & Wint.* (fl. Apr.–Mai.) (v.v.)

21. ERYSIMUM, *L.*

The species of this genus are most difficult of determination and diagnosis. Nos. 1, 4, 5, 6 & 11 seem very distinct forms; in the remainder we have little confidence. Of the majority of the described European, Asiatic, and Oriental species we can make nothing at all.

§ 1. *Vage ramosæ. Siliquæ maturæ horizontales, subsessiles, pedicello brevi crasso.*

1. E. REPANDUM (*Linn.*). Ramosum, foliosum, foliis lanceolatis integerrimis v. repando-dentatis, pedicellis calyce multo brevioribus, siliquis glaberrimis teretiusculis pedicello horizontali crasso vix latioribus in stigma truncatum attenuatis.

E. Griffithianum, *Boiss. Diagn.* sér. 2, i. p. 28.

Hab. In Affghanistan arenosis triticetisque frequens! *Griffith*; Beluchistan! *Stocks*; Himalaya occidentali temperata, alt. 5000–7000 ped., Kashmir! *T. T.*, *Winterbottom.* (fl. Jun.) (v.v.)

Distr. Persia! Syria! Asia minor! prov. Caspian.; Rossia! Germania! Gallia! ins. Canaries!

Variat insigniter statura. *Flores* in exemplaribus ex Affghanistan minores quam in Himalaicis. *Siliquæ* primo erectæ. Ab *E. repando*, L., certe non differt.

2. E. SUBULATUM (*Gay, Erysim.*). Erectum, ramosum, pilis stellatis incanum, siliquis ut in *E. repando* sed tenuioribus et canis.

E. Persicum, *Boiss. Plant. Auch. Eloy*, 4105.

Hab. Affghanistan! *Griffith.*

Distr. Persia!

Exemplaria vetusta, robusta, multo majora quam Persicum unicum a nobis visum.

§ 2. *Parvulæ, ramulis e radice multicipiti congestis.*

3. E. PULVINATUM? (*Gay, Erys.*). Radice multicipiti, ramis brevibus, foliis ½″ long. lineari-lanceolatis subacutis pilis appressis canis, scapis (ramulis florentibus) brevibus paucifloris erectis.

E. Aucheri, *Boiss. Plant. Auch. Eloy*, 4111.

Hab. Affghanistan! *Griffith.*

Distr. Mons Elamond, Persiæ!

Examplar solitarium sine fructu (et ideo species incerta), cum iis florentibus fructiferisque *Aucheri* bene congruit.

4. E. DEFLEXUM (*H. f. & T.*). Parvulum, pilis appressis canum v. glabratum, radice valida, foliis lineari-spathulatis subdentatis, ramulis florentibus brevibus, fructiferis horizontaliter deflexis apice ascendentibus, pedicellis sepala æquantibus, siliquis anguste linearibus erectis $1\frac{1}{2}$–$1\frac{3}{4}$″ long. subtetragonis apice in stylum $\frac{1}{12}$″ long. attenuatis, replo dorso plano septo subspongioso.—An forma *E. stricti?*

Hab. In Himalaya orientali alpina, Sikkim, 12000–15000 ped.! *J. D. H.* (fl. Jul.) (v.v.)

Species singularis ob ramulos fructiferos deflexos prostratos. *Folia* $\frac{1}{2}$–$\frac{3}{4}$″ long. *Rami* floriferi 1–2″, fructif. 3–5″ longi. *Flores* ochroleuci, $\frac{1}{3}$″ long. *Siliquæ* $\frac{1}{20}$″ lat., funiculis brevibus.

5. E. FUNICULOSUM (*H. f. & T.*). Pusillum, radice robusta, collo fastigiatim ramoso, ramis brevissimis, foliis lineari-lanceolatis pilis appressis, ramulis floriferis brevibus, siliquis fastigiatis erectis glabris compressis, $\frac{3}{4}$″ long., valvis obscure carinatis apice in stylum brevem conicum sensim attenuatis, funiculis strictis semine longioribus.

Hab. In Himalaya orientali alpina, Sikkim interiore, alt. 14000–16000 ped.! *J. D. H.* (v.v.)

I have only two specimens of this remarkable little plant, gathered with the preceding. The root is very stout, bearing a tuft of short branches and very short flower-bearing ramuli; the flowers are about the same size as the preceding; the erect siliquæ appear fastigiate owing to the number of small branches given off from the root, and are broader, flatter, and less keeled than in any of its allies. The very long strict funicles are a curious character.

§ 3. *Siliquæ 3–5″ longæ.*—Erectæ, caule simpliciusculo robusto folioso.

6. E. THOMSONI (*H. f.*). Elatum, erectum, ramosum, pilis appressis canum, foliis (parvis) lineari-lanceolatis acuminatis subdentatis, flori-

bus mediocribus, siliquis longissimis erectis 3–4″ long., $\frac{1}{10}$″ latis, pedicello valido $\frac{1}{3}$″ long., valvis acute carinatis canis acutis, septo opaco, stylo subelongato.

Hab. In Himalaya occidentali temperata, Kunawur supra Lippa, 8000–12000 ped. (exempl. fructif.)! ? Kashmir ad Baramula Pass, alt. 5000 ped.! *Winterbottom* (exempl. florif.). (fl. Mai.) (v.v.)

The hoary-branched habit, small narrow acute leaves, and very long pods well distinguish this species. Winterbottom's specimen, not being in fruit, is doubtfully referred here.

7. E. LONGISILIQUUM (*H. f. & T.*). Erectum, elatum, robustum, glabrum, caule acute angulato, foliis lanceolatis acutis acuminatisve subdentatis, floribus majusculis, siliquis crasse longiuscule pedicellatis patentibus 4–5″ long., $\frac{1}{10}$″ lat., anguste linearibus, stylo crassiusculo, valvis carina prominula.

Hab. In Himalaya orientali temperata, Sikkim, alt. 10000–13000 ped.! *J. D. H.* (v.v.) (fl. Jun.)

The tall robust habit, sharply angled stems, middling-sized flower, and very long patent pods best distinguish this.

§ 4. *Siliquæ* 1–2″ *longæ.*—Erectæ, caule simpliciusculo robusto folioso.

8. E. STRICTUM (*Gærtn.*; *Led. Fl. Ross.* i. p. 189). Erectum, subramosum, caule superne angulato, foliis oblongis denticulatis sinuato-dentatisve pilis tripartitis appressis, superioribus sessilibus, floribus mediocribus, pedicellis calycem æquantibus, siliquis erectis strictis $1\frac{1}{2}$–2″ long. $\frac{1}{15}$″ lat. tetragonis appresse scaberulis, costa crassa, stylo siliquam latitudine superante, stigmate bilobo.

E. patens *et* E. gracile? *Gay*, p. 9.—E. robustum, *Don, Prodr.*; *Wall. Cat.*—E. angulatum, foliosum, *et* longiflorum, *Hb. Royle.*

Hab. In Himalaya occidentali et centrali temperata et subalpina, ad regionem Tibeticam vulgatissimum, alt. 6000–13500 ped., a Nepal! *Wallich*, ad Marri! *Fleming*. (fl. Mai.) (v.v.)

Distr. Europa borealis! media! et australis! Asia minor! Persia! Altai!

Siliquæ mire variant longitudine $\frac{1}{4}$–$1\frac{1}{2}$″ long., et stylus longitudine. *Folia* denticulata v. sinuato-dentata. *Flores* multo minores quam in sequente.

9. E. ODORATUM? (*Ehr. Beitr., fid. Led. Fl. Ross.* i. p. 192). Erectum, robustum, caule superne angulato, foliis lanceolatis oblongisve sinuato-dentatis v. integerrimis appresse scaberulis, floribus maximis, pedicellis calyce dimidio brevioribus, "siliquis quadrangularibus a latere subcompressis incanis angulis glabrioribus virentibus, stylo latitudine siliquæ sublongiore, stigmate bilobo."—Led. *l. c.*

Hab. In Himalaya occidentali temperata, Kashmir, 5000–7000 ped.! *Winterbottom, T. T.*; Tibetia occidentali, alt. 9000 ped.! *Wint.* (fl. Jun.) (v.v.)

Distr. Europa media! et australis!

Siliquæ exempl. Indicorum ignotæ, species hinc dubia.

10. E. ALTAICUM? (*C. A. Meyer; Led. Fl. Ross.* i. p. 189). Caule brevi erecto stricto gracili simplici, foliis petiolatis lineari-lanceolatis integerrimis v. sinuato-dentatis, radicalibus interdum runcinato-pinnatifidis appresse incanis, floribus magnis, "siliquis compresso-tetragonis erectis pilis bipartitis plus minus incanis, stylo brevi subancipiti, stigmate bilobo."—Led. *l. c.* An *E. ochroleucum*, DC.?—an forma *E. odorati*?

Hab. In Himalaya et Tibetia occidentali temperata, Kashmir et Kishtwar, 7000–10000 ped.! *Jacquemont*; et Balti, alt. 9000 ped.! *Winterbottom.*

Distr. Caucasus! Siberia Altaica!

Siliquæ ignotæ. *Flores* magni, ut in *E. odorato.*

11. E. PACHYCARPUM (*H. f. & T.*). Erectum, robustum, ramosum, sparse appresse pilosum, caule polygono angulis acutis, foliis lanceolatis acutis acuminatisve petiolatis sinuato-denticulatis, pedicellis calyce brevioribus, floribus (pro planta) parvis, siliquis crassis crasse pedicellatis patentibus strictis 2–2½" long. ⅛" lat. tetragonis, valvis glaberrimis obtuse carinatis, stylo brevi crasso.

Hab. In Himalaya orientali temperata et alpina, Sikkim, alt. 11000–16000 ped.! *J. D. H.* (fl. Jun.) (v.v.)

Species elata, valde robusta, ramosa, ramis elongatis, floribus interne aurantiacis, petalis obovato-spathulatis. *Replum* planiusculum; septum crassum. *Semina* non alata.

The remarkably large stout spreading pods, with very short thick pedicels, best distinguish this.

Quid *Erysimum* 2, Herb. Strachey & Winterbottom, e Tibetia, prov. Gugi, alt. 15500 ped., sine fructu?

22. CHRISTOLEA, *Camb.*

1. C. crassifolia, *Camb. in Jacq. Voy.* p. 17, t. 17.

Hab. In Tibetia occidentali alpina et subalpina, 12000–15000 ped.! frequentissima, a Gugi! *Str. & Wint.*, ad Zanskar! et Balti! *T. T.* (fl. Jun.) (v.v.)

Herba glabra v. pubescens, fragilis, ramosissima; ramis decumbentibus crassiusculis, foliis obovatis, cuneatis acutis obtusisve apices versus grosse paucidentatis; floribus ebracteatis, pedicellatis. *Sepala* æqualia. *Petala* obovato-spathulata, lutea v. basi purpurea. *Stamina* edentula. *Ovarium* latiusculum; *stigmate* sessili, 2-lobo. *Siliqua* lineari-lanceolata, utrinque attenuata, compressa, plana, valvis planiusculis ramosis obscure 1-nerviis, replo tenui, septo medio 2–3-nervi completo v. apice fisso. *Semina* sub 2-seriata, funiculis brevissimis.

Variat insigniter statura, longitudine ramorum, indumento molliter pubescente v. 0, magnitudine foliorum et forma cuneata obovata v. spathulata integerrima et lobata, necnon floribus parvis v. amplis et diametro longitudineque siliquarum.

23. Leptaleum, *DC.*

1. L. filifolium, *DC. Syst.* i. p. 511.

L. pygmæum, *DC. l. c.*

Hab. In Affghanistan arenosis ad Sinab, etc., vulgatiss.! *Griffith*; prope Peshawur! *Vicary*; Beluchistan! *Stocks.*

Distr. Siberia Uralensis! Soongaria! Caspian.! Persia!

Herba annua, parvula, glabra, ramosa, glaucescens, foliis filiformibus integris pinnatipartitisve, floribus paucis albis subsessilibus. *Sepala* erecta, basi æqualia. *Petala* linearia, sepalis multo longiora. *Stamina* edentula, filamentis longioribus per paria connatis. *Stigmata* in conum arcte conniventia. *Siliqua* indehiscens! compressa, sessilis, lateribus rotundatis; valvis duris, venosis, medio depresso costatis. *Semina* 2-seriata, perplurima, testa echinulata.

24. Braya, *Stern. & Hoppe.*

Distinguished from *Sisymbrium* chiefly by habit, and smaller, short pod, as *Draba* is from *Arabis.*

§ 1. *Scapi uniflori.*

1. B. uniflora (*H. f. & T.*). Densissime cæspitosa, humilis, glaberrima, radice crassa multicipiti v. collibus crassis petiolorum basibus albis vestitis, foliis carnosis lineari-spathulatis integerrimis, scapis 1-floris foliis brevioribus, siliquis linearibus, stylo brevi, seminibus quovis loculo 8–10 vix biseriatis, septo 2-nervi.

Hab. In Tibetia occidentali alpina, Nubra, alt. 15000–17000 ped.! *T. T.* (fl. Aug.) (v.v.)

§ 2. *Flores racemosi v. corymbosi.*

2. B. Thomsoni (*H. f.*). Glaberrima, foliis erectis anguste lineari-spathulatis, scapis strictis rigidis nudis v. foliatis, siliquis apicem versus scapi fasciculatim congestis erecto-recurvis lineari-oblongis teretibus $\frac{1}{4}''$ long., valvis lanceolatis convexis 1-nerviis, seminibus 1-seriatis 6–8 quovis loculo, stylo breviusculo, funiculis semini æquilongis.

Hab. In Tibetia occidentali subalpina, Piti, alt. 12000–13000 ped.! *T.T.*

B. alpinæ arcte affinis, differt siliquis curvis fasciculatis.

3. B. Tibetica (*H. f. & T.*). Tota canescens v. pubescens, rigidula, radice gracili multicipiti, foliis anguste linearibus integerrimis, scapis nudis, floribus siliquisque corymboso-capitatis, petalis calycem vix excedentibus, siliquis pubescentibus brevibus ovatis calyce vix duplo longioribus, valvis enerviis oblongis, stylo longiusculo, seminibus loculis 4–6, funiculo gracili.

Hab. In Tibetia occidentali alpina et subalpina frequens, alt. 13000–18000 ped.! *T. T.* (fl. Jun.–Jul.) (v.v.)

B. roseæ et *æneæ* simillima, differt siliqua pubescente, stylo brevi robusto, et ? stigmate non capitato.

4. B. ROSEA (*Bunge*; *Led. Fl. Ross.* i. p. 195). Glaberrima v. foliis basi scapisque apice parce pilosis pubescentibusque, foliis anguste lineari-oblongis longe petiolatis, scapis aphyllis, floribus siliquisque dense corymboso-congestis, petalis sepalis sub duplo longioribus, siliquis lineari-oblongis v. elliptico-oblongis brevibus calyce vix duplo longioribus, loculis sub 4–8-spermis, valvis glaberrimis nervo flexuoso, stylo breviusculo v. subelongato.

Hab. In Himalaya alpina interiore, alt. 15000–17000 ped., Sikkim! *J. D. H.*; Kumaon! *Str. & Wint.*; Kunawur! *Jacq.*; Tibetia occidentali alpina, Ladak! Zanskar! et Nubra! alt. 14000–18000 ped., *H. Strachey & T. T.* (fl. Jun.–Jul.) (v.v.)

Distr. Mont. Altai! et Siberia arctica!

A *B. Tibeticæ* formis glabrioribus differt siliquis pluriovulatis petalisque majoribus.—An ambæ cum *B. ænea,* Bunge, *B. alpinæ* varietates?

Stirps valde variabilis. A descriptione *B. roseæ* cl. Ledebour differt siliquis parvis brevibus, sed cum examplaribus *Drabæ roseæ* a cl. Turczaninov et Bunge ips. missis, in alpibus Nuchu Daban annis 1836 et 1839 lectis, omnino congruit.

5. B.? OXYCARPA (*H. f. & T.*). Foliis lineari-spathulatis subacutis integerrimis glaberrimis, scapo apicem versus foliato, floribus siliquisque racemosis pedicellisque puberulis, siliquis teretiusculis erectis elliptico-lanceolatis in stylum longiusculum acuminatis glaberrimis, seminibus biseriatis 8–10 quovis loculo, valvis vena flexuosa minimis longe funiculatis.

Hab. In Tibetia occidentali subalpina, Piti prope Lara, alt. 12000–13000 ped.! *T. T.* (fl. Sept.) (v.v.)

Genus ob semina immatura dubium, habitu, foliis, inflorescentia et siliqua cum *B. Thomsoni* bene convenit.

25. BRASSICA, *L.*

§ 1. *Valvæ uninerviæ, nervo valido, v. 3-nerves, nervis lateralibus flexuosis. Semina 1–4-seriata, globosa.—Folia caulina basi auriculato-amplexicaulia.*

1. B. CAMPESTRIS (*Linn.*). Erecta, glabra v. basi hispido-pilosa, glaucescens, foliis inferioribus lyrato-pinnatifidis, superioribus ovatis ovato-lanceolatisve basi auriculato-cordatis, siliquis erecto-patentibus, stylo ancipiti-subulato.

Sinapis brassicata, *L.*—S. dichotoma *et* glauca, *Roxb. Fl. Ind.*

Hab. Per totam Indiam, Himalayam, Affghanistan, Beluchistan, et Tibetiam in agris hortisque culta multis formis variisque nominibus, nullibi indigena.

"Raie," *Hind.* Cultivated for inferior bland oil, used for cooking by natives only, and for burning by all classes.

2. B. TRILOCULARIS (Brassica, *Roxb. Fl. Ind.* iii.). Foliis inferioribus lyrato-pinnatifidis v. integris, caulinis amplexicaulibus cordato-auriculatis, siliquis maturis magnis pendulis longe valide rostratis 3–4-locularibus 3–4-valvatis, rostro teretiusculo, valvis 3-nerviis, nervis lateralibus flexuosis.

Hab. In Himalaya subtropica centrali et orientali, Nepal, *Roxb.*; Sikkim agris *B. campestris* sparse occurrit! *J. D. H.*; Assam! *Masters.* (fl. hieme.) (v.v.)

Species ob siliquas magnas pendulas facile diagnota.

3. B. QUADRIVALVIS (*H. f. & T.*). Foliis inferioribus lyrato-pinnatifidis v. integris, caulinis basi auriculato-cordatis, siliquis majusculis erectis lineari-oblongis teretibus 4-valvatis rostro valido longo ancipiti-subulato, valvis 3-nerviis, nervis lateralibus flexuosis.

Hab. In planitie Gangetica, arvis *B. campestris* prope ripam fl. Soane sparse occurrit! *J. D. H.* (fl. hieme.) (v.v.)

A *B. triloculari* bene distinguitur siliquis erectis et rostro ancipiti.

§ 2. *Valvæ* 1–3-*nerviæ, nervis lateralibus flexuosis. Semina* 1-*seriata, globosa.—Folia superiora basi angulata v. petiolata.*

4. B. JUNCEA (*L.*). Erecta, ramosa, glaberrima, foliis inferioribus lyrato-pinnatifidis v. integris, caulinis basi angustatis v. petiolatis, omnibus integerrimis v. inciso-dentatis, sepalis patulis, siliquis lineari-lanceolatis rostro recto compresso, valvis 3-nerviis, nervis lateralibus flexuosis.

Sinapis juncea, *L., DC., &c.*—S. Chinensis, *Willd.*—S. lævigata, *Linn., DC., &c.*—S. integrifolia, *Willd.*—S. ramosa, rugosa, patens, *et* cuneifolia, *Roxb.*—S. lanceolata, *DC.*—S. Timoriana, *DC.*; et verisimiliter aliæ multæ.

Hab. Per totam Indiam, Himalayam temperatam et tropicam, Tibetiam temperatam et Affghanistan culta.

Distr. Europa australis! China! et alibi tropicis subtropicisque culta.

This is the "Soorsa," an acrid mustard, cultivated for its oil, which is used for burning, rubbing the body in illness, &c.

5. B. NIGRA (*Koch*; *Led.* p. 217). Glabra, foliis omnibus petiolatis, inferioribus lyratis dentatis, superioribus lanceolatis integerrimis, sepalis patulis, siliquis parvis rachi appressis apice in stylum gracilem attenuatis, stigmate capitato, valvis nervo valido solitario.

Sinapis erysimoides, *Roxb.*; *Wall. Cat.* 4790.

Hab. In Affghanistan, *Griffith*; Beluchistan, *Stocks*; Himalaya occidentali subtropica, Kunawur! *T. T.*; Kumaon! *Str. & Wint.* (v.v.)

Distr. Persia! Syria! Asia minor! Europa tota! Africa borealis! et trop.!

Common Mustard; rarely cultivated in India.

6. B. DEFLEXA (*Boiss. in Ann. Sci. Nat.* sér. 2, xvii. p. 87). Glabra v. hispido-pilosa, erecta, ramosa, foliis petiolatis, inferioribus oblongis integris pinnatilobatisve sinuato-dentatis, caulinis lanceolatis, sepalis patentibus, siliquis anguste linearibus longe pedicellatis demum

deflexis, valvis tenuibus alte torulosis 1-nerviis marginibus incrassatis, rostro teretiusculo obtuso sensim attenuato.

B. Tigridis, *Boiss. l. c.*

Variat caule foliis sepalisque glabris v. hispido-pilosis, magnitudine florum, rostroque siliquæ 1-spermo v. aspermo.

Hab. Beluchistan ad portum Gundara! *Stocks*; Affghanistan, ad Candahar in agris! *Griffith.*

Distr. Persia!

§ 3. *Siliqua angulata, valvis 3–5-costatis, costis validis. Semina* 1-*seriata, globosa.—Folia petiolata.*

7. B. ARVENSIS (*Linn.*). Caule foliisque pilosis, sepalis patulis, siliquis subtorulosis, costis acutis, rostro subancipiti.

Hab. Affghanistan ad Candahar! *Griffith.*

Distr. Europa tota! Africa borealis! Persia! Syria! reg. Caspian.; Siberia.

§ 4. *Eruca.*—Folia petiolata. Siliqua teretiuscula, valvis nervo solitario valido costatis, rostro lato ensiformi. Semina 2-seriata, globosa.

8. B. ERUCA (*Linn.*). Foliis lyrato-pinnatipartitis laciniis dentatis acutis, calyce piloso, pedicellis calyce brevioribus.

Hab. In Himalaya occidentali temperata! *Str. & Wint.*; planitie Gangetica superiore! et Panjab! *T. T.*; Affghanistan, alt. 10000–12000 ped.! *Griffith.*

Distr. Persia! Syria! Asia minor! reg. Caspian.! Europa australis! Africa borealis! ins. Canaries!

§ 5. *Erucastrum.*—Semina compressa, 1-seriata.

9. B. STOCKSII (*H. f. & T.*). Glaberrima v. hispido-pilosa, ramosa, foliis petiolatis, inferioribus lyrato- v. runcinato-pinnatilobatis sinuato-dentatisque, caulinis integris pinnatifidisve, floribus parvis albis, siliquis erectis linearibus, valvis 1-nerviis lateralibus indistinctis, rostro elongato lineari-compresso obtuso, seminibus compressis.

Hab. Beluchistan, *Stocks*! in Panjab! et Tibetia occidentali temperata! culta! *Edgeworth, T. T.*; itin. a Delhi ad Ajmir! *Jacquemont.* (fl. Feb.) (v.v.)

§ 6. *Diplotaxis.*—Semina 2-seriata, parva, compressa. Valvæ planiusculæ, 1-nerviæ.—Folia non amplexicaulia.

10. B. GRIFFITHII (*H. f. & T.*). Erecta, ramosa, robusta, patentim hispido-pilosa, foliis oblongis oblongo-lanceolatisve lyrato-pinnatilobatis v. sinuato-lobatis, caulinis oblongo-lanceolatis, floribus amplis lilacinis longe pedicellatis, sepalis lateralibus basi saccatis, siliquis longe linearibus stipitatis, valvis teneribus planis, rostro brevi, seminibus parvis 2-seriatis.

Hab. In Affghanistan agris ad Oostad! *Griffith*; Beluchistan! Stocks; Panjab, Kalebag ad Salt Range! *Fleming*. (fl. Feb.)

B. (*Dipl.*) *pendulæ*, Boiss. (*hispidæ*, DC.), similis, differt floribus lilacinis, siliquis erecto-patentibus longioribus ($2\frac{1}{2}''$ long.), pedicellis elongatis, fructiferis pollicaribus, styloque longiore. *Moricandiæ hesperidifoliæ* quoque similis calyceque congruens basi saccato, differt hirsutie, pedicellis elongatis et siliquis angustioribus.

26. MORICANDIA.

1. M. ARVENSIS (*DC.*). Glaberrima, glauca, foliis integerrimis, caulinis cordato-amplexicaulibus, siliquis compresso-tetragonis rostro latiusculo, seminibus sub 2-seriatis.

Moricandia arvensis, *DC.*—Diplotaxis brassicoides, *Koch.*—Brassica Moricandia, *Boiss. Voy. Bot. dans l'Est*, ii. p. 96.

Hab. Beluchistan ad Johan! *Stocks.*

Distr. Arabia! Europa australis a Græcia! ad Hispaniam! Tunis! Algeria!

2. M. TORTUOSA (*H. f. & T.*). Glaberrima, foliis petiolatis elliptico-oblongis obtusis apiculatis integerrimis v. sinuato-crenatis, siliquis lineari-elongatis subcylindricis, valvis convexis obscure nervosis, costa distincta, rostro cylindrico acuto, seminibus 1-seriatis.

Douepia tortuosa, *Camb. in Jacq. Voy. Bot.* p. 18, t. 18.

Hab. In Panjab salsuginosis prope Pind-dadur-Kahn! *Jacquemont*! et ad Salt Range! *Fleming.*

27. CAPSELLA, *Br.*

1. C. Bursa-pastoris, *L.*

Hab. In Affghanistan! *Griffith*; Beluchistan! *Stocks*; Bengalia! Himalaya! Tibetiaque! tota temperata et subalpina, ruderatis locisque cultis. (v.v.)

Distr. Ubique in temperatis.

2. C. ELLIPTICA (*C. A. M.*! *Led. Fl. Ross.* i. p. 199). Siliquis ellipticis obtusis v. subtruncatis.

Hutchinsia procumbens, *DC.*

Hab. In Affghanistan! agris prope Pushut! *Griffith*; Beluchistan! *Stocks*; Tibetia occidentali temperata, alt. 14000 ped., *T.T.* (fl. Mai.) (v.v.)

Distr. Reg. Caspian.! Soongaria! Bokhara! Persia! Syria! Africa bor.! Europa media! et australis! Chili! Australia temp.!

3. C. THOMSONI (*H. f.*). Depressa, ramis prostratis apicibus ascendentibus, dense cano-tomentosa, foliis pinnatisectis segmentis brevibus confertis oblongis integris lobatisve, racemis robustis foliosis, siliqua late oblonga utrinque subtruncata apice retusa, stylo brevissimo, seminibus numerosis, valvis venosis dorso anguste carinatis.

Hab. In Tibetia occidentali alpina, 16000–18000 ped.! Ladak, *T.T.*; Nubra! *H. Strachey.* (fl. July.) (v.v.)

Affinis *Hutchinsiæ calycinæ*, Desv. (*Smelowskia calycina*, C. A. M.).

28. Lepidium, *L.*

§ 1. *Pedicelli patentes. Siliqua ovato-cordata, acuta; valvis apteris. Stylus filiformis.*

1. L. Draba, *L.* (*Led. Fl. Ross.* i. p. 202). Perenne, erectum v. diffusum, pubescens, foliis late oblongis obtusis dentatis, infimis petiolatis integris v. lyratis, caulinis sagittato-amplexicaulibus, siliquis late ovatis ovato-cordatisve acutis.

Hab. In Affghanistan! *Griffith*; Peshawur! *Vicary*; Beluchistan in cultis! *Stocks.*

Distr. Persia! Syria! Asia minor! reg. Caspian.! Arabia.! Siberia! Europa tota!

2. L. propinquum (*Fisch. & Mey.*; *Led. l. c.*). Perenne, erectum, glabrum v. puberulum, foliis oblongis acutis serrato-dentatis basi attenuatis sessilibus non cordato-amplexicaulibus, siliquis *L. Drabæ.* —An *L. Drabæ* varietas?

Hab. In Affghanistan! *Griffith.*

Distr. Reg. Caspian.!

§ 2. *Pedicelli suberecti v. erecto-patentes. Siliqua ovata v. elliptica, integerrima, valvis carinatis apteris. Stigma sessile v. stylo brevi.*

3. L. latifolium (*L.*; *Led. l. c.*). Erectum, ramosum, glabrum v. pubescens, foliis ovatis ovato-lanceolatisve, inferioribus petiolatis serratis, caulinis subsessilibus, petalis calyce longioribus, siliquis orbiculatis elliptico-ovatisve integerrimis pilosis glabrisve, stigmate sessili, valvis carinatis apteris.

Hab. In Tibetia occidentali temperata frequens! *Jacquemont, Winterbottom, T. T.* (fl. Jun.) (v.v.)

Distr. Europa tota! Algeria! Asia minor! Persia! reg. Caspian.; Soongaria! Siberia! China! in Americam introductum.

4. L. crassifolium (*Walds. & Kit.*; *Led. Fl. Ross. l. c.*!). Glabrum v. puberulum, caule erecto v. diffuso, foliis sabcarnosis petiolatis ovato-lanceolatis ovatisve acutis integerrimis, caulinis supremis cordato-amplexicaulibus, petalis calyce longioribus, siliquis late ovatis, stigmate sessili, valvis carinatis reticulatis apteris.

L. pumilum, *Boiss.*

Hab. In Affghanistan! et Beluchistan! salsuginosis, *Griffith, Stocks.*

Distr. Persia! Asia minor! reg. Caspian.! Altai! Tauria! Hungaria!

5. L. Persicum (*Boiss.*! *in Ann. Sc. Nat.* sér. 2, xvii. p. 196). Glabrum v. pubescens, perenne, elatum, ramis gracilibus virgatis, foliis infimis oblongis petiolatis obtusis integerrimis v. grosse serratis, caulinis linearibus, racemis paniculatis elongatis, pedicellis suberectis,

floribus tetradynamis, petalis calyce duplo longioribus, siliquis late ovatis obtusis apice integris valvis carinatis apteris.

a. Stylo brevissimo.—*L. Persicum,* Boissier in Herb. Aucher Eloy!

β. Stylo distincto.—*L. Persicum,* Boissier; Kotschy, Plant. Pers. Aust. (No. 343.)

Hab. a et *β*. In Affghanistan variis locis! *Griffith.*

Distr. a et *β*. Persia!

§ 3. *Pedicelli suberecti v. siliquæ ramo appressæ. Siliqua suborbiculata v. quadrata, apice emarginata; valvis carinatis dorso alatis. Stylus brevissimus. Cotyledones 2-partitæ.*

6. L. SATIVUM (*L.*). Erectum, glaberrimum, foliis membranaceis, inferioribus obovatis longe petiolatis, superioribus lineari-oblongis sessilibus, omnibus integris v. varie incisis lobatisve, siliquis oblongo-orbiculatis valvis superne alatis.

Hab. In peninsula occidentali! Bengalia! India superiore! Himalaya temperata et subtropica! Tibetiaque temperata! vulgare, semper cultum. (fl. per tot. ann.) (v.v.)

Distr. Ubique cultum; nullibi indigenum?

7. L. AUCHERI (*Boiss.*! *Ann. Sc. Nat.* sér. 2, xvii. p. 195). Annuum, glaberrimum, ramis robustis prostratis, foliis anguste obovato-oblongis spathulatisve, inferioribus remote pinnatipartitis lobatisve, racemis floriferis brevissimis, fructiferis robustis, siliquis rachi appressis pedicellum robustum æquantibus oblongo-subquadratis, valvis apice crasse alatis rotundatis v. angulatis.

Hab. In Affghanistan! *Griffith*; Beluchistan, hortis ad Gundara! *Stocks.*

Distr. Persia!

A *L. spinoso,* L. (quocum a cl. Boissier bene comparatum est), differt insuper racemis floriferis brevissimis.

§ 4. *Pedicelli patentes. Siliqua apice brevissime emarginata; valvis carinatis, apteris. Stylus brevissimus.*

8. L. PERFOLIATUM (*Linn. Led. l. c.* p. 207). Glaberrimum, erectum, ramis gracilibus, foliis infimis (cito deciduis) pinnatisectis segmentis lobatis v. multifidis, caulinis profunde cordato-amplexicaulibus obtusis integerrimis, floribus minimis, siliquis late ovato- v. orbiculato-ellipticis glabris vix emarginatis, valvis carinatis apteris, stylo brevissimo.

Hab. In Affghanistan ad Quettah! *Griffith*; Beluchistan ad Khanuk! *Stocks.*

Distr. Persia! Syria! Soongaria! Siberia! reg. Caspian.! Asia minor! Europa media!

9. L. RUDERALE, *L.* (*Led. l. c.*). Annuum, puberulum, foliis radicalibus pinnatipartitis laciniis integerrimis v. inciso-dentatis, caulinis

linearibus, floribus apetalis diandris, siliculis late elliptico-orbiculatis vix emarginatis, valvis carinatis apteris, stylo brevissimo.

L. capense, *Br.*; Africanum, *DC.*; desertorum, *Eckl. & Zey.*, et multa alia.

Hab. In Tibetia occidentali temperata, alt. 7000–13000 ped., *T.T.*; Affghanistan! *Griffith.* (fl. Jun.) (v.v.)

Distr. Siberia! Persia! Asia minor! Europa tota! America borealis! Africa australis! Australia extratropica!

10. L. CAPITATUM (*H.f. & T.*). Glaberrimum v. ramis et inflorescentia glanduloso-puberulis, ramis prostratis foliosis, foliis anguste cuneato-oblongis sessilibus supra medium grosse dentatis laciniatisve, racemis lateralibus brevissimis densifloris capituliformibus, floribus tetrandris, petalis sepala æquantibus, siliquis *L. ruderalis.*

L. incisum, *Edgew. in Linn. Trans.* i. p. 33 (non *Ledebour*).

Hab. In Himalaya temperata et subalpina, Sikkim, alt. 12000–14000 ped.! *J. H.*; Kumaon, alt. 13000 ped.! *Edgeworth, Strach. & Wint.*; Tibetia occidentali vulgare, alt. 10000–14000 ped., *T. T.* (fl. Jul.) (v.v.)

Affinis *L. micrantho*, Led., differt caule ramisque procumbentibus, et conspicue racemis capituliformibus ramulos brevissimos laterales terminantibus.

Quid *Lepidium setosum*, Boiss. (Diag. sér. 2, i. p. 45), planta sine fructu regni Cabulici a Griffith (No. 1483) lecta?—Numerus "1483" Herbarii Griffithiani ad *Sisymbrium Griffithianum* pertinet.

29. DILOPHIA, *Thoms.*

1. D. SALSA, *Thoms. in Hook. Kew Gard. Misc.* v. p. 20, et iv. t. 12.

Hab. In Tibetia occidentali temperata et alpina! paludibus salsis, alt. 12000–17000 ped., *T. T.* (fl. Jun.) (v.v.)

Herba glabra, pusilla, depressa, perennis, crassiuscula; ramis divaricatis, prostratis, foliosis; foliis anguste spathulatis, integris v. lobato-dentatis; racemis in capitula umbellasve subsessiles contractis, floribus albis. *Sepala* brevia, et *petala* retusa v. dentata marcescenti-persistentia. *Stamina* edentata. *Ovarium* 8-ovulatum, breviter stipitatum, stylo crasso, stigmate obtuso. *Siliqua* late didymo-biloba; valvis crassiusculis, a replo latissimo oblique secedentibus, dorso crasso bicristatis, cristis lobulatis, loculis 1–4-spermis; septum fenestratum.

30. ÆTHIONEMA, *Br.*

1. Æ. CRISTATUM (*DC. Syst.* ii. p. 60; *Led. Fl. Ross.* i. p. 209). Foliis ovatis basi simplici v. cordata sessilibus, siliquis imbricatis utrinque emarginato-bilobis 2–4-spermis alis grosse dentatis.

Hab. In Affghanistan glareosis! *Griffith*; Beluchistan! *Stocks.*

Distr. Persia! Asia minor! reg. Caspian.!

31. Heldreichia, *Boiss.*

1. H. silaifolia (*H. f. & T.*). Glabra, foliis pinnatisectis, pinnis remotis laciniato-3–5-fidis segmentis angustis, caule superne dichotome ramoso, siliquis obtriangulari-obovatis.

Hab. In Affghanistan, agris ad Liah-sung! *Griffith.*

Radix fusiformis, descendens. *Collum* reliquiis rigidis fibrosis foliorum coronatum. *Folia* 4–6-pollicaria, petiolo basi vaginante; pinnis paucis distantibus ½" long., laciniis angustis. *Siliqua* ⅓" lat., fere ½" long., basi cuneata, lateribus rotundatis, stylo gracili. *Petala* longe gracile unguiculata. *Ovarium* suborbiculare, apice bilobum, stylo æquilongum. *Funiculi* elongati.

32. Megacarpæa, *DC.*

1. M. polyandra (*Benth. in Kew Journ. Bot.* 1855, vol. vii. p. 353. t. 7). Siliquis didymis, valvis orbiculatis.

Hab. In Himalaya occidentali subalpina, alt. 12000 ped.! *Str. & Wint.*; Tibetia occidentali temperata, Balti, alt. 10500 ped.! *Winterbottom.* (fl. vere.)

2. M. bifida (*Benth.*). Siliquis didymis, valvis oblongis.

Hab. In Tibetia occidentali temperata in valle Kishnaganga, alt. 7400 ped.! *Winterbottom.* (fl. Jun.)

33. Thlaspi, *Dill.*

1. T. arvense (*Linn.*). Erectum, foliis oblongis dentatis, caulinis sagittato-amplexicaulibus, seminibus concentrice sulcatis.

Hab. In cultis Himalayæ totæ temperatæ et subalpinæ, alt. 6000–14000 ped., Affghanistan! alt. 6000–14000 ped., *Griffith*; Tibetia occidentali temperata, *T.T.* (fl. Jun.–July.) (v.v.)

Variat sinu siliquæ aperto v. clauso.

Distr. Europa! Asia! et America! temperata et subarctica.

2. T. cardiocarpum (*H.f. & T.*). Erectum, foliis late oblongis subdentatis, caulinis late sagittato-amplexicaulibus, siliquis obcordatis sinu profundo lobis latis rotundatis, seminibus lævibus.

Hab. In Himalaya occidentali temperata, Kashmir! alt. 6000–9000 ped., *T.T.*; Affghanistan! *Griffith.* (fl. Apr.–Mai.) (v.v.)

T. Kotschyano, Boiss. et Hoh. (Persiæ borealis), *T. orbiculato,* Stev. (Iberiæ), et *T. brevicauli,* Boiss. et Kotsch, valde affine: an omnia unius varietates?—Siliqua ea *T. perfoliati* duplo major.

3. T. perfoliatum (*Linn.*). Erectum, foliis subdentatis radicalibus petiolatis orbiculatis ovatisve, caulinis ellipticis oblongisve cordato-amplexicaulibus, siliculis orbiculari-obcordatis sinu lato, ala lata nervo marginata lobis apice rotundatis.

Hab. In Affghanistan! *Griffith.*

Distr. Siberia; reg. Caspian.; Syria! Asia minor! Europa media et australis tota!

4. T. ALPESTRE (*Linn.*). Cæspitosum, radice multicipiti, caulibus simplicibus, foliis radicalibus petiolatis oblongis ovatisve, caulinis ovato-cordatis sessilibus cordato-amplexicaulibus, ovario 8–16-ovulato, siliquis triangulari-obcordatis basin versus attenuatis ala valvularum antice latitudine loculi, seminibus lævibus.

Carpoceras Griffithianum, *Boiss. Diagn.* sér. 2, No. 1, p. 40.

a. Stylo brevi sinum æquante.

β. Stylo elongato.—*T. cochleariforme,* DC. Syst. ii. p. 381; *T. alpinum,* Jacq.?

Hab. In Himalaya temperata et subalpina tota, alt. 7000–12000 ped., a Sikkim! *J. D. H.*, ad Marri! *Fleming.*; necnon in Tibetia temperata! *T.T. & Winterbottom,* et Affghanistan! *Griffith.* (fl. vere.) (v.v.)

Distr. Siberia altaica! Soongaria! Europa borealis! et temperata! Asia minor! America borealis temperata! et Andes Am. meridionalis!

We find such great variation in the length of the style and number of seeds in the cells of the pod of this plant, as to be in great doubt to what species of modern European authors it should be referred. That it is the same as Linnæus's *T. alpestre* we have no doubt; but if all the Himalayan specimens are referable to one, we do not see how it, *T. cochleariforme,* DC., *montanum,* L., *præcox,* Wulf, and numerous other more recent species can well be considered as anything but varieties. Our Sikkim specimens are small and immature. Griffith's plant, found in woods and about cultivation, is considerably larger, but, not being in fruit, is doubtfully referred here: it is the *Carpoceras Griffithianum,* Boiss., who considers it very distinct from its allies, but does not say how it differs. To us it looks like a luxuriant state of *T. alpestre.*

5. T. COCHLEARIOIDES (*H. f. & T.*). Parvulum, glaberrimum, foliis longissime petiolatis ovato-orbiculatis subdentatis, caulinis paucis sessilibus, scapo flexuoso decumbente paucifloro, siliquis oblongis emarginatis curvis tortis, valvis compressis anguste alatis, stylo gracili.

Hab. In Himalaya orientali alpina, Sikkim interiore! alt. 14000–16000 ped. rarissimum, *J. D. H.* (fl. Jun.) (v.v.)

Habitus *Cochleariæ Himalaicæ.*—*Caules* subcæspitosi, radice laxe multicipiti elongato. *Foliorum* lamina parva, carnosula, sæpe lacunosa, petiolo pollicari. *Flores* parvi, albi.

34. IBERIDELLA, *DC.*

1. I. ANDERSONI (*H. f. & T.*). Glaberrima, foliis radicalibus ovato-oblongis obtusis breve petiolatis, caulinis oblongis obtusis auriculato-cordatis, siliquis elliptico-lanceolatis utrinque acutis, stylo brevi, valvis polyspermis.

Hab. In Himalaya occidentali alpina, alt. 12000–16000 ped.! Kumaon! et Garwhal! *Str. & Wint.* (Draba 4, 12, & Crucif. incog. 3) *T. Anderson.* (fl. Jun.)

35. Clypeola, *L.*

1. C. Ionthlaspi (*Linn.*). Siliquis margine integris disco setulis brevissimis asperulo.—*Griff. It. Not.* p. 240 (No. 330).

Hab. In Affghanistan, *Griffith.*

Distr. Persia! reg. Caspian.! Arabia! Syria! Asia minor! Europ. aust. a Græcia! ad Hispaniam! Algeria!

2. C. echinata (*DC. Syst.* ii. p. 328). Siliquis margine dentatis disco setis sub lente glochidiatis horrido.

Hab. In Affghanistan! *Griffith*; Beluchistan! *Stocks.*

Distr. Persia! Syria!

36. Moriera, *Boiss.*

1. M. spinosa (*Boiss! Ann. Sc. Nat.* sér. 2, xvi. p. 381, xvii. p. 182). Erecta, aphylla, ramosa, ramis tandem spinescentibus, foliis linearibus minutis, siliquis subquadratis utrinque late emarginato-bilobis, alis latis membranaceis.

M. Cabulica, *Boiss. Diagn.* sér. 2, i. p. 41.

Hab. In Affghanistan, Erak et Kohi-baba, alt. 11000–15000 ped.! *Griffith.*

Distr. Persia!

37. Isatis, *Tournef.*

1. I. tinctoria (*Linn.*). Pedicellis glaberrimis, siliquis cuneato-oblongis basin versus sensim angustatis, apice rotundatis emarginatisve, costa solitaria medio incrassata.

Hab. In Affghanistan, agris circa Otipore! *Griffith.*

Distr. Europa tota! ins. Canaries! Syria! Asia minor!

2. I. Iberica (*Stev.! in Mém. Soc. Nat. Mosc.* iii. p. 267; *Led. Fl. Ross.* i. p. 213). Pedicellis calycibusque hispido-pilosis, siliquis lineari-cuneatis pubescenti-tomentosis apice emarginato truncatis, costa solitaria medio incrassata.

I. minima, *Bunge.*

Hab. In Affghanistan! *Griffith*; Beluchistan! *Stocks.*

Distr. Persia! reg. Caspian.! Asia minor!

3. I. costata (*C. A. Meyer! Led. Fl. Ross. l. c.*). Pedicellis glaberrimis, siliquis elliptico-oblongis apice rotundatis, disco trijugo nervisque 2 lateralibus prominulis.

Hab. In Tibetia maxime occidentali temperata, valle Kishnaganga, alt. 7400 ped.! *Winterbottom.*

Distr. Siberia!

38. Tauscheria, *Fisch.*

1. T. desertorum, *Royle, Ill.* p. 72, t. 17. (T. gymnocarpa *et* lasiocarpa, *DC.*, *Ledeb.*, *&c.*)

Hab. In Himalaya! et Tibetia! occidentali temperata, alt. 10,000–13,000 ped., Kunawur! *Royle*; Zanskar! *T.T.* (fl. Jun.) (v.v.)

Distr. Soongaria! reg. Caspian.! Altai!

39. Dipterygium, *Dcn.*

1. D. glaucum, *Dcn., et* D. scabrum, *Dcn.! in Ann. Sc. Nat.* sér. 2, iv. p. 67, t. 3. (Pteroloma Arabicum, *Hochst. & Steud.*—Isatis spartioides, *Edgew.*)

Hab. In Panjab ad Mooltan! *Edgeworth*!

Distr. Arabia! Nubia! Sennaar!

40. Neslia, *Desv.*

1. N. paniculata, *Desv.; Led. Fl. Ross.* i. p. 214.

Hab. In Himalaya occidentali temperata, Kashmir, alt. 5000–6000 ped.! *T. T.*; Beluchistan triticetis frequens! *Stocks*; Affghanistan! *Griffith*. (fl. Jun.) (v.v.)

Distr. Europa media! et australis; Asia minor! Syria! Persia! Arabia! Siberia.

Herba erecta, ramosa, pilosa, pilis 2–3-fidis, foliis caulinis basi sagittatis, floribus parvis flavis racemosis longe gracile pedicellatis ebracteatis; siliqua parva, stylo distincto, subrugosa, lateribus costatis. *Sepala* basi æqualia. *Petala* flava. *Siliqua* compressa, subglobosa, stipitata, subossea, indehiscens, 1–2-locularis (septo interdum incompleto), 1–2-sperma. *Semen* horizontale.

41. Octoceras, *Bunge.*

1. O. Lehmanianum, *Bunge.*

Hab. In Beluchistan ad Nichara! *Stocks*; Affghanistan, arenosis et glareosis prope Quettah! *Griffith.*

Distr. Regio Caspica!

42. Euclidium, *Br.*

1. E. syriacum (*Br. Hort. Kew.*). Caule diffuse ramoso pilis trifurcatis hispido, foliis caulinis oblongis, siliquis hirtis, stylo subconico persistente.—*Led. Fl. Ross.* i. p. 167.

Hab. In Himalaya maxime occidentali temperata, Kashmir, alt. 5000–6000 ped.! *Winterbottom, T.T.*; Affghanistan agris frequens! *Griffith*; Beluchistan! *Stocks.* (fl. Apr.) (v.v.)

Distr. Soongaria! Persia! Syria! Asia minor! Caucasus! Hungaria!

2. E. tataricum (*DC. Syst.* ii. p. 422). Caule pilis simplicibus hispido, foliis linearibus integerrimis v. sinuato-dentatis pilosis, siliquis glabris, stylo demum deciduo.—*Led. Fl. Ross.* i. p. 167.

Hab. In Affghanistan vallibus glareosis, alt. 5300 ped.! *Griffith.*

Distr. Soongaria! Caspian.!

43. Pyramidium, *Boiss.*

1. P. Griffithianum, *Boiss. Diagn.* sér. 2, No. 1. p. 47.

Hab. In Affghanistan ad Dair-Haj! *Griffith.* (v.s.)

Variat foliis siliquisque fere glabris v. subtomentosis.

Genus *Buniadi* proxime affine differt præcipue calyce elongato, petalis

anguste linearibus, stigmatibus erectis, et siliqua suberosa; caule ramoso, foliis simplicibus oblongis sinuatis obtusis, racemis ebracteatis, floribus distantibus subsessilibus ebracteatis *Mathioloideis.—Herba* annua, stellatim tomentella. *Sepala* angusta, erecta, elongata, lateralia basi subsaccata. *Petala* anguste linearia, lamina torta. *Stamina* simplicia. *Ovarium* pedicellatum, lineare, 4-loculare; loculis per paria superpositis, 1-ovulatis, stigmatibus erectis. *Siliqua* triangularis, pyramidata, rostrata, crassa, intus suberosa, basi utrinque appendice cornuformi horizontali aucta, 4-locularis, 4-sperma, septis crassis, loculis interdum obliteratis v. distortis. *Semina* pendula, compressa; embryone hemicyclo; radicula oblique notorhiza; cotyledonibus rectis.

44. Crambe, *Tournef.*

1. C. cordifolia (*Stev.! Mém. Soc. Nat. Mosc.* iii. p. 267). Gigantea, sparse hispido-pilosa, foliis radicalibus amplis cordato-rotundatis inæqualiter dentatis, caulinis consimilibus v. ellipticis v. cuneatis varie dentatis lobatisve, siliqua mutica articulo supremo globoso.—*Led. Fl. Ross.* i. p. 223.

C. Kotschyana, *Boiss. Diagn.* v. p. 19.

Hab. In Tibetia occidentali temperata, alt. 10000–14000 ped.! Kunawur! *Jacquemont*; Gugi! *Str. & Wint.*; Piti! *T. T.*; Affghanistan ad Kushuk Pass! *Griffith*; Beluchistan! *Stocks.* (fl. July.) (v.v.)

Distr. Persia! Caucasus.

Radix edulis, *Stocks.*

In exemplaribus Stracheyanis petala latiora et stamina omnia breviora sunt; filamentis 2 longioribus latere dilatatis, vix (ut in Griffithianis, &c., et planta Stevenii) supra medium dente recurvo auctis.

45. Raphanus, *L.*

1. R. sativus (*L.*). Siliqua continua suberosa intus cavernosa.

Hab. Per totam Indiam! Himalayam temperatam, tropicam et alpinam Tibetiam! et Affghanistan! cultus.

Distr. Ubique cult.

2. R. Raphanistrum (*DC.*). Siliqua inter semina constricta, intus non lacunosa, articulis sulcatis.

Hab. In Affghanistan! *Griffith.*

Distr. Europa tota! Africa borealis! et alibi introductus.

46. Goldbachia, *DC.*

1. G. lævigata, *DC.* (G. tetragona *et* G. torulosa, *DC.*)

Hab. In Affghanistan! *Griffith*; Beluchistan! *Stocks*! Panjab frequens! Himalaya occidentali temperata ad Kashmir, alt. 5000 ped.! *Jacquemont, T. T.* (fl. Mai.) (v.v.)

Distr. Soongaria! Persia! Asia minor! reg. Caspian.! Rossia australis!

47. Chorispora, *DC.*

1. C. tenella (*DC. Syst.* ii. p. 435). Annua, tota glanduloso-pilosa v. glabrata, foliis oblongo-lanceolatis spathulatisve, floribus purpurascentibus, siliquis teretibus crasse pedicellatis vix torulosis ad articulos obscure constrictis, stylo rigido subulato elongato.—*Led. Fl. Ross.* i. p. 169.

Hab. In Himalaya occidentali temperata, Kashmir, alt. 5000–7000 ped.! *T. T.*; Affghanistan! *Griffith*; Beluchistan! *Stocks.* (fl. Apr.–Mai.) (v.v.)

Distr. Soongaria! Siberia! reg. Caspian.! Persia!

2. C. Sibirica (*DC. l. c.* p. 437). Annua, tota glandulis sparsis pilisque simplicibus aspersa, foliis interrupte pinnatifidis, siliquis gracilibus gracile pedicellatis curvis æqualiter moniliformi-torulosis, stylo gracili. —*Led. l. c.*

Hab. In Tibetia occidentali temperata, ad Hasora! *Winterbottom.* (fl. Jul.)

Distr. Siberia altaica! Soongaria!

3. C. sabulosa (*Camb.*! *in Jacq. Voy. Bot.* p. 15, t. 15). Perennis, tota pilis glandulosis adspersa, foliis integris v. pinnatifidis, floribus albis flavis? v. purpureis, siliquis gracile pedicellatis, irregulariter torulosis articulis gibbosis, stylo gracili tenui.

C. elegans, *Camb. l. c.*, p. 14, t. 14 (*fid. Hb. Hook.*).

Hab. In Himalaya et Tibetia occidentali alpina et subalpina, alt. 11,000–17,000 ped., Kashmir! *Jacquemont, &c.*; Gugi, *Strachey & Winterbottom*; Zanskar! Ladak! Nubra! et Balti! *T. T. & Winterbottom.* (fl. Jun.) (v.v.)

Note on the Fructification and Affinities of *Hydnum gelatinosum*, Fr.

By Frederick Currey, Esq., M.A., F.R.S. & L.S.

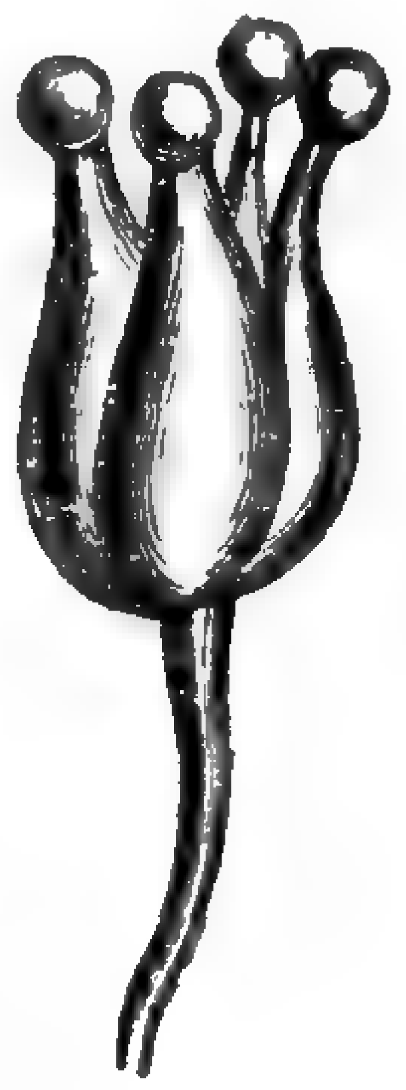
[Read November 15th, 1860.]

Hydnum gelatinosum is of very rare occurrence in this country. It is, I believe, not uncommon in fir-woods in Sweden, but it has only been observed on two occasions in England. About three years ago, I met with four or five small specimens of it in a sawpit in a wood at Weybridge in Surrey. It was then growing on sawdust. In the same locality in October of the present year (1860) I found a number of small specimens growing on the sawdust in the pit, and upon a log of fir which was lying near at hand were some plants of a larger size. *Hydnum gelatinosum* is peculiar in the genus to which it belongs, being one of the few species of a soft gelatinous texture, its consistence approaching very nearly to—in fact, being almost identical with—that of *Tremella*.

The fructification of the orders *Hydnei* and *Tremellini* has hitherto been considered distinct, the hymenium of the former having been supposed to consist (as is doubtless the case in most plants of the order) of oval or cylindrical basidia, each bearing four spicules or sterigmata, and each sterigma a spore, as in the *Agaricini*.

In the *Tremellini*, as M. Tulasne has shown*, the structure is totally different. The fruit there consists of a mass of threads imbedded in the jelly of the plant, each thread producing at its apex four cells united together, or, rather, a four-lobed cell, each of the lobes of which gives out from its apex a rather long filament, at the tip of which a spore is produced.

Upon examining the fructification of *Hydnum gelatinosum*, I was surprised to find that, although in its external characters it is a perfect *Hydnum*, it bears the fruit of a *Tremella*. If one of the teeth be examined with the microscope, it will be seen to consist of threads, bearing four-lobed sporophores and spores exactly similar to *Tremella*. As far as I can see, the only difference (a very unimportant one) is that the prolongation of the apex of each of the lobes of the sporophores is considerably shorter than is usually the case in *Tremella*. It will thus be seen that the plant is exactly intermediate between the orders *Hydnei* and *Tremellini*, forming as it were a stepping-stone from one to the other; and as this peculiarity has not hitherto been noticed, I have thought it a point of sufficient interest to bring before the notice of the Society. The woodcut represents the fruit in question highly magnified, consisting of a thread crowned by a four-lobed sporophore, each of the four tips of the sporophore being surmounted by a spore.



Extract from a Letter, addressed to Sir WILLIAM J. HOOKER, on the Botany of Benguela, Mossamedes, &c., in Western Africa. By FREDERICK WELWITSCH, Esq., M.D., A.L.S.

[Read Jan. 17th, 1861.]

S. Paulo de Loando, August 16, 1860.

. . . . My last journey to the southern districts of the province (Benguela, Mossamedes, and Huilla) was at first intended to

* Ann. des Sc. Nat. 3 sér. vol. xix.

extend over a few months, merely for the investigation of the littoral region, as at that time I was still suffering from the effects of fever: only in case of the entire re-establishment of my health did I contemplate penetrating the interior to Huilla. I set out at the end of June 1859, from Loando for Mossamedes, calling at Benguela. The magnificent climate of Mossamedes was so delightful, and so speedily restored my shattered health, that after a stay of five weeks I had quite recovered, and felt myself a new man. I therefore gradually extended my excursions further and further—first northward, and southward along the coast to beyond Cape Negro and Port Alexander, then more and more inland; and as the month of October approached, with which, in this region, the spring sets in, I felt induced and encouraged, by the entirely new vegetation which the shores of Benguela and Mossamedes presented, in contrast to that of Loando, to visit the elevated plateau of Benguela, known under the name of *Huilla*, which rises at about a distance of eighty miles from the coast, and slopes to the east towards Quipungo, to the north and north-east towards Quilengues and Caconda. And I am indeed delighted and abundantly satisfied that I undertook this excursion; for I am now convinced that I have seen the most beautiful and the most magnificent scenery that the tropics of South Africa can offer.

Before, however, I speak of the vegetation of the plateau of Huilla, which rises from about 5800 to 6000 feet above the sea-level, allow me to tell you a little about the interesting flora of the coast between Mossamedes (*i.e.* Little Fish Bay) and Cape Negro.

In the latitude of Benguela the character of the coast flora of Loando is nearly quite lost; other species, with other genera—indeed new families (as *Sauvagesiaceæ*, *Sesameæ*, &c.) occur, and the vegetation becomes much more varied and manifold than we find it over the long littoral tract between the mouths of the Zaire and the Cuanza. The large number of species of *Loranthus*, which, glorying in the brightest colours, grew upon nearly all *Frutices*—indeed on *Fruticuli*—and which were then in full flower, were particularly striking to me in the neighbourhood of Benguela. *Herminiera elaphroxylon*, as a tree, is extremely common, together with many other natives of Senegambia. Species of *Zygophyllaceæ* begin here with *Zygophyllum simplex* and with a second species, and become, with numerous species of spinose *Mimoseæ* (including *Acaciæ*), more and more frequent towards the tropic. The latter are all more or less clothed with *Roccella fuciformis*,

and afford orchil and gum arabic in abundance, and of the best quality. In the gardens of Benguela, especially along the banks of the river Cotumbella, European vegetables (*Oleracea*) thrive admirably, and growing with and amongst them are all the fruits of tropical and subtropical regions, as *Citrus*, *Olea europæa*, *Anacardium*, *Ananassa*, *Ficus carica*, *Vitis vinifera*, *Elaïs*, *Musa paradisiaca*, *Punica Granatum*, various species of *Anona*, two species of *Psidium*, &c. &c. The vine bears twice annually grapes of very good flavour. At Mossamedes (or Little Fish Bay) we find an entirely new coast flora; the quantity of *Tribulus cistoides*, with its numerous bright golden flowers, hardly serves to recall the flora of the islands about Loando. Several pretty species of *Sesuvium* and *Mesembryanthemum*, together with *Limeum* and *Giesekia*, are found on the sands of the coast, and a subarboreous *Euphorbia* on the adjoining sand hills covers whole miles, interrupted here and there by masses of *Zygophyllum*. On both of these latter plants, or perhaps rather on their roots, a *Hydnora* appears to be common, the flowers of which are sometimes trimerous, sometimes tetramerous; it may probably, however, be identical with the Cape *Hydnora*, although removed from it by 12° of latitude. Several species of *Kalanchoë* and a *Monsonia*, as also everywhere in damp places a luxuriant *Tamarix* (*T. gallica*?), remind one of Senegambia; in the standing waters are *Lemna*, *Marsilea*, *Scirpus*, *Potamogeton*, *Pistia* and *Nymphæa*, and about their margins *Hydrocotyle*, *Juncus*, *Lythrum* (!), with *Jussiæa*, *Equisetum*, *Polycarpeæ*, and several species of *Ammannia*, also *Typha*, *Triglochin*, *Atriplex*. Besides these there is a motley mixture of various floras, with a prevailing correspondence to that of Senegambia and the Cape of Good Hope. A pretty *Vogelia* (*Plumbaginaceæ*) is also met with. At a distance of a mile from the coast, however, the forms characteristic of the Cape flora are lost; the vegetation becomes with every step richer in purely tropical forms, which are especially developed on the banks of the Béro, in a variety one would never have imagined, in so apparently dry a coast region. The cultivated plants of Mossamedes offer a similar medley of the species of different zones. Bananas and Potatoes, Mandiocca and Wheat fields, *Saccharum officinarum* and *Linum usitatissimum*—fields, some of *Hordeum distichum*, others of *Batatas paniculata*, and the like, are all mingled together. *Ananassa*, *Anacardium*, and *Elaïs guineensis*, however, will no longer thrive; and Mossamedes would seem to indicate the southern limit of these and of many other tropical cultures on the western coast of Africa.

The flora, becoming ever poorer, from Mossamedes to Cape Negro, consists chiefly of *Euphorbieæ*; amongst which, however, several plants of geographical interest occur, as, for example, a *Cuscuta*! a *Pimpinella*-like annual Umbellifer, also several annual *Phytolaccaceæ*; as e. g. *Limeum* and *Giesekia*, with which a *Sarcostemma* (*ramis virgatis*!) is here and there associated. The almost complete absence of marine Algæ along nearly the whole thirty geographical miles of coast between Mossamedes and Cape Negro is remarkable. I could only find 2 *Ulvaceæ* and 3 *Rhodophyceæ*.

Several miles before reaching Cape Negro the coast rises to a height of about 300 to 400 feet, forming a continuous plateau, extending over six miles inland, as flat as a table. This tabular elevation, which is composed of calcareous tufa (tuf) and strata of clay, is scattered all over with loose sandstone shingle, and clothed with a vegetation which, though scanty, consists of plants of the highest interest; among them a dwarf tree was particularly remarkable, which, with a diameter of stem often of 4 feet, never rose higher above the surface than 1 foot, and which, through its entire duration, that not unfrequently might exceed a century, always retained the two woody leaves which it threw up at the time of germination, and besides these it never puts forth another. The entire plant looks like a round table, a foot high, projecting over the tolerably hard sandy soil; the two opposite leaves (often a fathom long by 2 to 2½ feet broad) extend on the soil to its margin, each of them split up into numerous ribbon-like segments. As I bring some specimens of this wonderful plant to Europe, together with flowers and fruit, and shall thus have the opportunity of presenting it *in natura*, it will suffice just now to append to the foregoing a short notice of it in technical language.—Truncus obconicus, 1–1½ ped. altus, 1–5 ped. diametr., dure lignosus, apice truncato-disciformis, undique resinam, illæ *Coniferarum* similem, exudans; discus nunc circularis aut plerumque oblongus vel ellipticus, dure suberosus, margine folia duo, opposita, glauca, ligneo-dura, crassissima, tenacissima, linearia, lata basi sessilia, in laminas inæquales plurimas longitudinales dilacerata, prostrata gerens. Pedunculi ad marginem disci, axillares, dichotome-partiti, floriferi, vix pollicares, demum sensim elongati, circiter palmares, in ramulorum (vel si vis in pedicellorum) apicibus flores (ut videtur polygamos) in amenta strobiliformia dense congestos gerentes. Amentaflorentia ½–1-pollicaria, maturescentia strobilos 1–3 pollices longos, digitum crassos, obtuse tetragonos, læte rubentes, *iis* Abietis *non absimiles* sistunt. Flores (quorum . . . . . . hermaphrod. vidi, germinibus

nec bene elaboratis) 6-andri, 1-styli, antheræ videntur 3-loculares et rimulis apertæ; stigma peltatum, dentato-lacerum, vel rhomboideum ut in quibusdam *Proteaceis*; caryopsis compressa in alam membranaceam producta;—semina matura non vidi, ... tegumento fibrillis copiosis (uti in *Casuarineis*) percurso certe gaudent! —Æthiopes accolentes singulare hoc floræ Africanæ productum *N'tumbo* vocant, quare genus, absque dubio indescriptum, forsan *Tumboa* dicendum erit; sed ob his omnibus, absque ulteriore et accuratiore examine nil certe affirmari potest, nec *Africa æquinoctialis Musis amica*!! In the meantime I may intimate that this dwarf tree probably represents the type of a quite peculiar family of the South African tropics, of which a closer examination of the tract to the eastward, and the coast extending southwards, may lead to the discovery of more species.

Unfortunately the space in this little letter of mine is so restricted that I must entirely pass over the flora of the country between Mossamedes and Huilla (which, though not very varied, is nevertheless highly interesting), in order that I may allude to the high plateau of Huilla, which, at a distance of about 100 geographical miles from the west coast, rises toward the east, and continuing more than thirty miles in that direction, gradually slopes to Guilengues, Caconda, and Quipungo.

I reached the high plateau of Huilla at the end of October 1859; thus in the middle of spring in the southern hemisphere. The entire appearance of the landscape, the aspect of forest and plain—indeed, the whole character of the vegetation was at once and entirely changed as though by magic. I fancied myself in a strange world. Everything about me would recall the delightful outlying lower mountains of Switzerland, did not numerous *Melastomaceæ*, *Apocynaceæ*, *Combretaceæ*, &c., remind me of the tropics. The highest summit of this plateau rises to 6000 feet above the sea. The measurement of a mountain crest, obviously lower than a neighbouring summit, gave me, by a standard thermometer, $201\frac{1}{2}°$ Fahr. as the boiling point.

The numerous species of *Loranthus* are accompanied by one *Viscum*.

Irideæ (and *Iris* itself) are numerous.

Of *Proteaceæ*, 10 species (5 belonging to a new genus) were observed.

Cyperaceæ develope in unwonted splendour.

A *Ranunculus* and 4 *Clematideæ* are everywhere common.

A *Cabombacea*, with a *Nymphæacea*, float upon the Lagôas.

A *Burmannia*, 15 species of *Utricularia*, and 10 species of *Eriocaulon*, with 5 species of *Lobeliaceæ*, 1 species *Serpicula*, 1 *Rumex*! 2 species *Epilobium*, and a *Richardia* spathâ sulphureâ, grow in the bogs.

Salix, *Rubus*, *Ericaceæ*, 5 species *Droseraceæ*, 2 species *Primulaceæ*, 2 species *Trifolium*, and 5 *Umbelliferæ* adorn the banks of streams.

A gigantic *Limosella*, a *Limnophila*, with the habit of a *Ceratophyllum*, a *Cyphia*, together with *Lythrum*, *Isnardia*, *Potamogeton* (3 species), 2 species *Ottelia*, and several other *Vallisneriaceæ*, hitherto only known from India, cover the stagnant waters.

Numerous species of *Gladiolus*, 22 species of *Orchideæ*, 30 species of *Filices*, and many very pretty *Scrophulariaceæ*, deck the damp slopes of the mountains with their many-coloured flowers.

Three species of *Selagineæ*, together with many small *Leguminosæ*, *Compositæ*, *Cyperaceæ*, and *Gramineæ*, constitute the vegetation of the pasture lands.

One *Osyris*, 3 species *Thesium*, and 5 *Daphnoideæ* (the latter of the most brilliant colour) adorn the dumeta, which are principally made up of *Duranta*, *Cyclonema*, and several species of *Strophanthus*.

Of the ten *Proteaceæ*, 4 or 5 of the species belong to an entirely new genus, which, with the character of a *Protea*, unites *flores longissime spicatos* and the habit of a *Salix*.

What, however, will most interest you, were 10 species of *Gentianeæ* and one *Rafflesiacea*, with the habit of *Apodanthes*, of which I had the fortune to find male and female flowers. This *Rafflesiacea* grows upon the branches of a *Leguminosa cæsalpiniacea*. I shall have the honour of sending you entire specimens of both male and female preserved in spirits. My collections to the south of the river Cuanza amount to about 2500 species. I hope to communicate to you specimens of all the interesting ones.

On a New British Plant. By Joshua Clarke, Esq., F.L.S.

[Read Nov. 1st, 1860.]

I wish to present to the Society specimens of a new British plant, *Lathyrus tuberosus* (Tuberous-rooted Vetch). It was collected at Fyfield, near Ongar, Essex, last August. It is a beautiful bright

crimson vetch; the flowers are not so large as *L. latifolius*, but of a brighter colour, and more elegant form. Leaflets ovate, tendrils 2-leaved, peduncles from 3- to 7-flowered; root forms large tubes, which run to a considerable depth in the soil.

It grows abundantly in the hedgerows, and in large quantities on the borders of cultivated fields, and among corn. It appears extended more or less over the parish, and in the adjoining one of Willingate Spain, an extent of about three miles. There is no appearance whatever of its being an introduced plant; the farmers spoke of it as growing on their lands for fifty years, and one stated he had known it for sixty years. They call it Tine Tare. What appears to me so remarkable is, that so beautiful a plant should not have been observed before.

There are very large quantities of it in the cultivated fields, and it is very conspicuous as you pass along the road.

It is a widely distributed continental species.

Discovery of *Isoetes Hystrix* in Guernsey, announced in a Letter addressed to the Secretary of the Linnean Society. By CHARLES C. BABINGTON, M.A., F.R.S., F.L.S.

[Read Dec. 20th, 1860.]

Cambridge, 19th Dec. 1860.

DEAR SIR,—I shall be obliged if you will announce at the Linnean meeting to-morrow evening the discovery of *Isoetes hystrix*, Dur., in Guernsey. It was found in June 1860, by Mr. G. Wolsey, the practical botanist who first noticed the *Ophioglossum lusitanicum* in that island. The locality is "rather damp spots on L'Ancresse Common."

This interesting species of *Isoetes* was first noticed near Algiers by Durieu in 1844, and has since that time been found in Corsica, near Cadiz in Spain, Cannes in Provence, Isle Houat and Belle Ile off the coast of Morbihan in north-west France. Thus Mr. Wolsey's discovery is a slight, but only a slight, northern extension of its range. It seems to prefer a granitic soil, and may be expected to be found in Cornwall. All the specimens found on this side of the Mediterranean Sea seem to be less amply furnished than those of Africa with the curious horned scales left by the decayed leaves as a coating to the corm. My African specimens have much fewer of them than are represented as present on the

individual beautifully figured in the botanical part of the 'Expédition scientifique de l'Algérie,' plate 36. The description of the plant is not published as yet in that work, but an extract from the manuscript will be found in Cosson's 'Notes sur quelques Plantes nouvelles, ou Critiques,' pp. 70–72, also in the 'Compt. Rend. Acad. Sc.' vol. xviii. p. 1167.

Lloyd has well described it under the name of *I. Delalandei*, in his 'Flore de l'Ouest de la France,' p. 549.

The plant was first taken for *I. Duriæi*, Bory; but that species has very different larger spores, and apparently also different small ones.

CHARLES C. BABINGTON.

On the Occurrence of *Festuca ambigua*, Le Gall, in the Isle of Wight. By ALEXANDER G. MORE, Esq., F.L.S.

[Read Feb. 7th, 1861.]

It is now several years since my attention was drawn to a remarkable grass which grows abundantly on the sea-side sandhills, or "dunes," at St. Helen's, in this island.

I have no doubt that it is the plant mentioned by Dr. Bromfield in his 'Flora Vectensis,' p. 606, as a variety of *Festuca uniglumis*, (Sol), characterized as having 3-flowered spikelets and monandrous florets; for, when I submitted some specimens from St. Helen's to Mr. Borrer, he informed me that he had himself gathered the same grass on "Ryde Dover," that being the very station given by Bromfield for his variety *β*. That Dr. Bromfield subsequently felt some doubt as to this "variety" may be inferred from his having omitted all mention of it in his "Catalogue of Hampshire Plants" published in the 'Phytologist.'

Our plant is, in aspect, somewhat intermediate between *Vulpia* (*Festuca*) *uniglumis* and *V. pseudo-myurus*, growing intermixed with the former, and resembling it a little in its compact and upright panicle (though the panicle of *Vulpia ambigua* is not nearly so stout as that of *V. uniglumis*). This resemblance, however, is only superficial, and a closer examination shows the true affinity of our grass to *V. pseudo-myurus*, with which the St. Helen's *Vulpia* agrees in the important characters afforded by the single stamen and by the constant presence of both glumes; besides that the larger glume of *Vulpia ambigua* is destitute of the awn found in *V. uniglumis*. It was in accordance with this view that I, last

year, distributed a large number of specimens under the name of *Vulpia pseudo-myurus*, var. *maritima*.

Quite recently I have obtained access to Le Gall's 'Flore de Morbihan' (1852), and I now feel satisfied that the St. Helen's grass answers to the description of the *Festuca ambigua* of that work, p. 731. The following is a description drawn up by myself from fresh Isle of Wight specimens.

VULPIA AMBIGUA. *Root* annual, fibrous. *Leaves* narrow, at first flat, then involute. *Culms* 8–12 inches high, numerous, tufted, suberect, geniculate below. *Sheaths* long, somewhat inflated, with a short truncate ligule, which becomes torn when the panicle forces its way through. *Panicle* purplish, unilateral, narrowly lanceolate, rather close, upright; its lowest branches at first included in the sheath, but ultimately just free; lowest branch reaching a little more than one-third up the panicle; rachis of the panicle and branches compressed, rough-edged. *Spikelets* containing 4–7 purplish florets. *Glumes* broadly bordered with membrane, very unequal, as 3–6 to 1; the lower glume ovate-lanceolate or triangular-ovate, often nearly obsolete; the superior glume oblong-lanceolate, acute or bluntish, its membranous border being often as it were eroded at the top; larger glume reaching one-third up the included contiguous floret. *Florets* scabrous with small points passing into short hairs, the inferior *pale*, terminating in an awn of nearly twice its own length. *Stamen* one.

It will have been seen that the differences between our plant and the normal state of *Vulpia pseudo-myurus* are just such as are relied upon for distinguishing the latter plant from *V. sciuroides*, Roth (*V. bromoides*, Smith); and it is hard to see why *V. ambigua* is less entitled to rank as a species. It is not expected, indeed, that those botanists who conjoin *V. pseudo-myurus* with *V. sciuroides* will be any more inclined to admit the distinctness of *V. ambigua*; and it may be urged that, in his 'Flore de l'Ouest,' M. James Lloyd speaks of a maritime variety of *Festuca pseudo-myurus* in such terms* as to lead to the conclusion that he intends *V. ambigua*; but, on the other hand, Le Gall considered his plant much more nearly related to *V. ciliata*, Link, to which he was disposed to refer *V. ambigua* as a non-ciliated variety: and it must be confessed that, excepting the cilia of the lower pale, *V. ambigua* has very nearly the characters of *V. ciliata*.

The only localities which I know for *V. ambigua* are situated on the north-west coast of France, as mentioned in the works of Le Gall and Lloyd, already quoted.

* "Varie sur les bords de la mer à valve supérieure obtuse (*F. ambigua*, Le Gall)."

The three closely allied species may be thus contrasted: premising that the term *Vulpia* is here adopted for that section of the Linnean *Festuca* which is distinguished by an annual root, and by having awns longer than the pale.

* *Lower pale ciliated.*

1. VULPIA CILIATA, *Link.* *Panicle* narrow, upright, its rachis downy. *Glumes* widely membranous, pointed, very unequal, 3–5 to 1; the larger glume reaching less than half-way up the included floret. *Awn* of lower florets 1½ time as long as the pale.

** *Lower pale not ciliated, scabrous.*

2. VULPIA AMBIGUA. *Panicle* narrow, close, upright, its lowest branch reaching more than one-third up. *Glumes* widely membranous, subacute or eroded, very unequal, 3–6 to 1; the larger glume reaching one-third up the included floret. *Awn* twice as long as the pale.

3. VULPIA PSEUDO-MYURUS, *Soy.-Will.* *Panicle* elongated, very narrow, nodding, interrupted below, often partly sheathed; its lowest branch reaching one-quarter up the panicle. *Glumes* membranous-edged, acuminate, unequal, 3 to 1; the larger glume reaching half-way up the included floret. *Awn* nearly twice as long as the pale.

In all these characters *Vulpia ambigua* is still more distinct from *V. Broteri*, Boiss and Reut, to which I was once inclined to refer it. *V. Broteri* has a short, upright, oblong panicle, distant from the sheath, and with its lowest branch reaching nearly half-way up. Its glumes are far less unequal, and more pointed than in *V. ambigua*: the larger glume reaches more than two-thirds up the included floret, and the awns are more than twice as long as the pale. Indeed, in the series, *V. Broteri* would take its place between *V. pseudo-myurus* and *V. sciuroides.*

There is still less fear of confounding *V. sciuroides* with any of the above. *V. sciuroides* has much stouter spikelets, a short, upright, oblong panicle far removed from the sheath. Its *glumes* are as 2 to 1, acuminate, with the dorsal nerve reaching to the top; larger glume nearly as long as the included floret, awn about equalling the pale; lower branches (when present) reaching nearly half-way up the panicle.

It is to be noticed that, in computing the proportions of the two glumes to each other and to the included floret, those of the terminal spikelet are not to be trusted, being always less unequal than the others. In several instances I have found a well-developed

inferior glume in the terminal spikelet of *V. uniglumis*; once I have seen it nearly half as long as the superior glume, which latter also, in the terminal spikelet of *V. uniglumis*, usually tapers into a rounded membranous point instead of an awn.

Parnell and Sowerby have drawn three stamens in the florets both of *Festuca bromoides* and of *F. pseudo-myurus*; but this I believe to be an error. Of our British *Vulpiæ*, only *V. uniglumis* has three stamens; in the others I have constantly found one stamen only. The figure of *Festuca pseudo-myurus* in 'English Botany' (tab. 1412), is far from good; the florets are too few, and much too stout, which gives the figure a kind of resemblance to *V. uniglumis*.

Bembridge, January 1861.

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THE END.

Printed by Taylor and Francis, Red Lion Court, Fleet Street.

JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

SUPPLEMENT TO VOL. V.—BOTANY.

FLORULA ADENENSIS.

A SYSTEMATIC ACCOUNT, WITH DESCRIPTIONS, OF

THE FLOWERING PLANTS HITHERTO FOUND AT

ADEN.

By THOMAS ANDERSON, Esq., M.D., F.L.S.,
H.M.'s Bengal Medical Service.

LONDON:
LONGMAN, GREEN, LONGMANS AND ROBERTS,
AND
WILLIAMS AND NORGATE.
1860.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

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Florula Adenensis. A systematic Account, with Descriptions, of the Flowering Plants hitherto found at Aden. By THOMAS ANDERSON, Esq., M.D., F.L.S., H.M.'s Bengal Medical Service.

[Read November 1, 1860.]

MUCH attention has of late years been directed to the military station of Aden, owing to its rapidly increasing importance, both in a political and commercial point of view; and now that it is visited weekly by the large steamers in their course to India, China, and Australia, its name has become as familiar as that of any of our Eastern settlements. From its commanding position at the entrance to the Red Sea, and from its forming an indispensable link in the chain of communication with our Eastern Empire, the importance of the settlement will increase with the development of our Indian possessions.

Besides the interest attaching to Aden as an isolated stronghold of Britain, and as the probable starting-point whence European civilization will spread over the rich territory of Arabia Felix, its physical peculiarities have always attracted considerable attention; and the anomalous appearance of its rugged, barren pinnacles of rock leaves an indelible impression on the memory of its numerous visitors, while a closer examination of its narrow valleys, and of the steep cliffs that almost encircle them, discloses a strange, though scanty, assemblage of plants and insects. Indeed, so

striking is its flora, that the Arabs, the original possessors of Aden, ages ago appropriated to the rock the Arabic name of its most peculiar and beautiful flower*.

Since Salt, who visited Aden in 1809, and probably collected a few plants there, several botanists, on their way to more productive regions, have spent a few hours in exploring its more accessible gorges during the detention of the steamer for a supply of coals. In 1846 M. P. Edgeworth, Esq., of the Bengal Civil Service, a gentleman well known by his valuable memoirs on Indian Botany and his long-continued labours in the cause of that science in India, collected 42 species within a very circumscribed area; the result of which limited botanical excursion was communicated to the Asiatic Society of Bengal in 1847. The insurmountable difficulties attending the identification of such obscure species as those composing the Aden flora, without having access to extensive libraries and herbaria, are shown by the alterations I have made in many of the specific names proposed by Mr. Edgeworth; while at the same time his valuable suggestions and accurate descriptions prove his extensive knowledge of genera and species. Fortunately for our knowledge of the flora, Dr. J. D. Hooker, on his route to India in 1847, remained two days at Aden, and made a most extensive and nearly complete collection of its plants.

On his return to England in 1851, with the assistance of Dr. T. Thomson, his fellow-traveller, he largely increased the number of specimens of his previous collection, and also added some species to the list. Lieut.-Colonel Madden and Sir Robert Schomburgk have also contributed a few species from Aden among their general collections sent to Sir W. Hooker. While detained at Aden on my return from India in May 1859, I was enabled to make two short excursions nearly to the centre of the peninsula, and, considering the limited character of the flora, I secured an extensive set of specimens of nearly all its species. I was so fortunate as to find most in a good state for identification; the result of a copious fall of rain which had occurred about three weeks before my visit, and which had brought most of the plants into flower, and imparted a slight tint of green to many of the least sterile

* "Aden" is the Arabic name of that beautiful and remarkable shrub the *Adenium obesum* (*Nerium obesum*, Forsk.). The European residents consider the species as quite peculiar to Aden; but this is an error, as it is found on some of the rocky promontories along the coast of the Red Sea. The name *Adenium*, adopted by Roemer and Schultz for this and another species (*A. Hongel*), is merely the Arabic name Latinized.

valleys. From these materials the present Florula has been compiled.

Most of the plants have required a careful comparison with a large suite of specimens from various localities, and the consultation of a formidable array of works on Indian and Arabian botany, in order to determine their synonymy and geographical distribution.

These labours have been greatly lightened by daily reference to Sir William Hooker's unrivalled herbarium and rich library; of both of which I have been permitted to make unrestricted use. Without repeated examinations of the East Indian Herbarium, and of the Arabian, Abyssinian, and Egyptian collections of Sieber, Delile, Aucher-Eloy, Schimper, and other travellers, in all of which the Kew Herbarium is peculiarly rich, the work could not have been accomplished. To Dr. Hooker I am indebted for hourly advice and assistance; while his entire Aden collections have been placed at my disposal for examination and description. Without this privilege the Florula could not have been commenced, as his collections considerably exceeded my own in number of species, and they thus form the basis of the Flora. To G. Bentham, Esq. I have to acknowledge my obligations for assistance in the determination of several specimens of *Leguminosæ*, *Scrophularineæ*, and *Lavandula*; as well as for the free use of his Herbarium.

Before proceeding to the purely descriptive matter, it appears desirable to notice, 1st, the physical aspect and climate of Aden; 2nd, a few of the peculiarities of its flora; 3rd, some facts in the geographical distribution of the species; and finally, to institute a comparison between its flora and those of one or two similarly situated localities.

1. Aden is a small rocky peninsula, in many features resembling our other stronghold, Gibraltar; and is situated on the southern coast of Arabia, in 12° 47′ N. lat., and 45° 10′ E. long. The maritime region called Tehama, of which it is a promontory, is a sandy, barren tract from 20 to 100 miles in breadth, extending along the shore of the Red Sea, from a point a little east of Aden to the Gulf of Akaba. A mountainous region of 4–7000 feet in elevation rises immediately beyond; this, from its height, attracts a considerable portion of the moisture borne from the Indian Ocean by the north-west monsoon, and thus, enjoying a climate favourable to the growth of luxuriant cereals and fruits, it has for ages been called the Happy Arabia. It forms a striking contrast to the sterile Tehama, in the southern portion of which rain but rarely

falls, while towards its northern extremity it is quite unknown. The few streams that enter from the mountains of Arabia Felix are speedily lost in its arid sands ; cultivation is therefore confined to the vicinity of the few towns and villages, and is dependent on a precarious supply of water from wells. The area of the Aden peninsula is about fifteen miles, its greatest breadth being five miles and its least three. It is connected with the Arabian coast by a narrow sandy isthmus, covered at high spring-tides; but formerly it was probably an island, since the whole district is of recent origin, being evidently a raised sea-beach; as is shown by the remains, twenty-three miles inland, of the ancient seaport of Mooza, formerly frequented by the Phœnicians. The peninsula is entirely composed of volcanic rocks of apparently great age, forming numerous precipitous peaks and narrow ridges, which on the southern and eastern sides rise from the sea in inaccessible cliffs, attaining their greatest elevation, 1775 feet, in the peak "Jibeel Shumshum." On the eastern side and towards the isthmus is a considerable depression, the crater of the volcano, surrounded on nearly all sides by high walls of rock and cinder. From the serrated ridge Jibeel Shumshum, numerous narrow valleys, shut in by precipices, radiate on all sides towards the sea, in which some end abruptly, while on the northern side others widen out into the limited sea-beach.

The only patches of vegetation occur at the base of these gorges, just above the sea-line; and the loose and tolerably fertile soil accumulated there consists of scoriæ mixed with sand and the detritus washed from the rocks above by the violent torrents which rush down every ravine after the rare but heavy falls of rain. Along the cliffs utter sterility reigns, except where a ledge of rock or a mass of cinder has allowed the accumulation of sufficient earth to afford sustenance to a few straggling bushes of *Capparis galeata* or *Adenium obesum*.

In so low a latitude the sun shines with intense force nearly throughout the year, and at Aden the solar power is increased by every peculiarity of physical conformation and climate. The undisturbed atmosphere stagnates in the walled-in valleys, where a death-like stillness always reigns. The black and naked rocks absorb by day the scorching rays transmitted through an ever-cloudless sky, only to radiate the pent-up heat by night, thus confining to the shore the cool but feeble breezes that occasionally spring up from the Indian Ocean. Accordingly, even in December, when the sun's power is at its lowest, Dr. Hooker found the

temperature of the soil at 107° Fahr. a few feet below the surface. In the hotter seasons of the year, the sun, even in the early morning, is overpowering, and above the rocks the air flickers from the intense heat; while all distant objects are distorted by an imperfect mirage. Almost perpetual drought is, of necessity, the concomitant of such a climate as I have described, and accordingly the annual rain-fall at Aden never exceeds 6 or 7 inches; this scanty amount being spread over the period between October and the end of April; while occasionally none falls for a year and a half. Still Aden is not considered unhealthy, even to Europeans, who seem to become soon accustomed to the heat; and so great is our power of adaptation to circumstances, that after a residence of a year or two the climate is spoken of as cool and pleasant from October to the end of March, and as bearable during the remainder of the year.

2. The vegetation of Aden closely resembles that of Arabia Petræa, of which it is evidently the southern extension. It is eminently of a desert character; the species being few in number (only 94), and being quite disproportioned to the number of genera and Natural Orders; even when the flora is compared with those of localities having similar areas, and similar relations to the mainland. Most of the species are limited in the number of individuals, a few only of the more arid forms predominating. *Dipterygium glaucum*, six or seven species of *Capparidaceæ*, *Reseda amblyocarpa*, *Cassia pubescens* and *obovata*, *Acacia eburnea* and a few *Euphorbiaceæ* are the only common plants; and some of these are so plentiful, that in many places they abound to the exclusion of all other plants. The other species are either very local, or sparingly scattered over the peninsula.

All the species are more or less peculiar in their habit, and some are so strange in their appearance as to constitute the anomalies of the Natural Orders to which they belong. As examples may be enumerated:—*Sphærocoma Hookeri* among *Caryophyllaceæ*, *Adenium obesum*, with its almost globular fleshy trunk, naked branchlets bearing a tuft of leaves and an umbel of beautiful flowers, *Moringa aptera*, in which the leaves are reduced to long subrigid raches, the prickly *Jatropha spinosa*, and, strangest of all, the *Æluropus Arabicus*, a grass with short spiny leaves, so sharp, that it was with the greatest difficulty I could procure specimens of it. The bright-green colour, which forms so pleasing a feature of the vegetation of the temperate and moist tropical regions of

the globe, is quite unknown at Aden. Here foliage is reduced to a minimum, and the superfluous moisture given off by leaves in less arid climates is stored up in fleshy stems against seasons of long-continued drought. With the exception of some *Capparidaceæ* and *Reseda amblyocarpa*, all the plants have either glaucous whitened stems and leaves, or are completely covered with a hoary pubescence.

Aridity, while reducing the amount of cellular tissue, has also favoured the production of spines; and though in many cases the development has not attained actual spinosity, still in rigid or distorted branches and asperities of stem and leaf bears witness to the modifying influence of the climate. Of the ninety-four species that constitute the flora, sixteen bear sharp thorns on some part of their structure. In some the leaves terminate in sharp, recurved hooks; in others the stipules are spinous; in a few the bracts are prickly, and in *Lycium europæum* and *Euphorbia cuneata*, the short stiff branches are terminated by short thorns. Several species yield gums or resinous matter, and their stems frequently become encrusted by these exudations, probably caused by the bark cracking from exposure to the great heat of the sun. I have observed resinous substances accumulated in various quantities on *Balsamodendron opabolsamum*, *Acacia Edgeworthii*, *Adenium obesum*, and the shrubby *Euphorbiæ*. All the *Capparidaceæ* (with the exception of *Mærua Thomsoni*), *Dipterygium glaucum*, *Reseda amblyocarpa*, the *Compositæ*, and a few others, are characterized by more or less pungency or aromatic odour,—qualities always possessed by plants of desert regions.

The small proportion of species to the number of genera and Natural Orders will be perceived by an examination of the accompanying Table :—

	Genera.	Species.		Genera.	Species.
Cruciferæ	3	3	Moringeæ	1	1
Capparidaceæ	4	9	Leguminosæ	8	11
Resedaceæ	1	1	Cucurbitaceæ	2	2
Polygalaceæ	1	1	Portulacaceæ	2	2
Caryophyllaceæ	2	2	Umbelliferæ	1	1
Malvaceæ	2	3	Rubiaceæ	1	1
Sterculiaceæ	1	1	Compositæ	5	5
Tiliaceæ	2	2	Apocyneæ	1	1
Geraniaceæ	1	1	Asclepiadaceæ	2	2
Zygophyllaceæ	2	2	Convolvulaceæ	2	3
Rhamnaceæ	1	1	Boragineæ	1	1
Terebinthaceæ	1	1	Solanaceæ	1	1

	Genera.	Species.
Scrophularineæ	4	4
Acanthaceæ	1	1
Verbenaceæ	1	1
Labiatæ	1	1
Plumbagineæ	1	1
Salvadoraceæ	1	1
Phytolaccaceæ	1	1
Salsolaceæ	1	1
Amarantaceæ	2	2
Paronychiaceæ	1	1
Nyctagineæ	1	2
Euphorbiaceæ	3	7
Urticaceæ	1	1
Gnetaceæ	1	1
Amaryllideæ	1	1
Cyperaceæ	1	1
Gramineæ	9	9

Total number of natural orders, 41; of genera, 79; of species, 94.

This aggregation, within so considerable an area, of almost solitary representatives of genera, is probably a feature peculiar to isolated desert localities. It first attracted my attention during my visit to Aden in 1859, and I have since drawn up tables of the species, genera, and natural orders of the Floras of Hong-Kong, Ischia, and Gibraltar; the results of which confirm my first impression. Hong-Kong and Ischia are nearly equal to Aden in area, and, though differing from it in being detached from the mainland, the sea has proved a less insurmountable barrier to the introduction of species from the neighbouring countries than the unpropitious climate of Aden, and the inaccessible walls of rock by which it is cut off from the rest of Arabia. Gibraltar, though of smaller extent than Aden, yet possesses so many features in common with it, as fully to justify a comparison of their floras. I am indebted to Mr. Bentham for the materials from which the Table of the Hong-Kong species is deduced. That of the flora of Ischia is taken from Gussone's elaborate Florula of that island*, all the cultivated and doubtful species and genera having been carefully rejected. Kelaart's 'Flora Calpensis' is the authority for the list of species of Gibraltar.

Table showing the proportion of Natural Orders, Genera, and Species in the Floras of Aden, Hong-Kong, Ischia, and Gibraltar.

	Natural Orders.	Genera.	Species.
Aden	1	1·92	2·29
Hong-Kong	1	4·59	7·90
Ischia	1	4·32	9·23
Gibraltar	1	3·50	6·70

The actual paucity of species in the vegetation of Aden, though indicated by this Table, will be more distinctly seen by a reference to the numbers from which the proportions were obtained.

* 'Enumeratio Plantarum Vascularum Inarimensium.'

	Natural Orders.	Genera.	Species.
Aden	41	79	94
Hong-Kong	122	560	965
Ischia	86	372	794
Gibraltar	68	243	456

These tables show that the great preponderance of natural orders and genera, relatively to the number of species, is not necessarily a distinguishing mark of the vegetation of similar localities; since it is not the result of situation or isolation, but is entirely due to climatic causes. In regions favourable to vegetation, as in Hong-Kong, Ischia, and Gibraltar, the balance is preserved by a constant struggle for existence going on between the species. At Aden, however, no such struggle takes place; but all the species have to strive against conditions tending to the entire extinction of vegetable life. Viewed in this light, the Flora appears a collection of desert species, selected from widely different natural orders and genera, and all alike contending with the excessive heat and drought.

Before noticing some facts in the geographical distribution of the species, I have only to advert to the unequal proportion borne by monocotyledonous to dicotyledonous plants. But eleven out of the ninety-four species are monocotyledons, of which nine are grasses. Of the remaining two, one is an exceedingly rare plant at Aden (*Pancratium tortuosum*), of which I found a solitary clump. The entire absence of Palms and *Polygonaceæ* seems also worthy of record. In so dry a climate Ferns and other Cryptogamia, with the exception of Lichens, are quite unknown.

3. The geographical distribution of even so small a number of species possesses several points of interest, particularly when regarded with reference to the extension of the Arabic Flora over the arid regions of the earth. Of the ninety-four species composing the Florula, fourteen, or a little less than a sixth, are endemic, and one constitutes a new genus, confined to Aden. They are as follows:—

Cleome paradoxa, *R. Br.*
—— pruinosa, *T. Anders.*
Mærua Thomsoni, *T. Anders.*
Sphærocoma Hookeri, *T. Anders.*
Hibiscus Welshii, *T. Anders.*
Sterculia Arabica, *T. Anders.*
Tavernieria glauca, *Edgew.*
Acacia Edgeworthii, *T. Anders.*
Ptychotis Arabica, *T. Anders.*
Convolvulus sericophyllus, *T. Anders.*
Anarrhinum pedicellatum, *T. Anders.*
Campylanthus junceus, *Edgew.*
Lavandula setifera, *T. Anders.*
Euphorbia systyla, *Edgew.*

The remaining eighty species have an extensive geographical

distribution, fourteen occurring over all the barren parts of the globe. The following Table shows how they spread east and west from Arabia as their centre:—

Table of Distribution of Aden Plants.

	Species.		Species.
Arabia	68	North-west India	21
Scinde	44	Persia	19
Egypt	29	Senegal	19
Abyssinia	25	Mediterranean	18

The desert flora, of which these species form a part, attains its greatest breadth in the African desert, about 5° east longitude, where it covers the territory between the 10th and 37th degrees of north latitude. In Asia, though prolonged into Scinde and the western portion of the Punjab, it is diminished in breadth to 7° or 8° of latitude; its southern limit being 23° north latitude in Scinde, and 30° or 31° north latitude in Affghanistan and the Punjab. The limits of this vegetation may be defined as follows:—Starting from its head-quarters, the rainless region of Arabia, the flora extends over the peninsula of Arabia, with the exception of the south-western mountainous district, and along the shores of the Persian Gulf, whence it spreads into Southern Persia. It includes the whole of Beloochistan, South Affghanistan, Scinde, and a part of the Punjab. West from Arabia Petræa the flora passes into Egypt and Nubia, and partially into Abyssinia, and extends over the African desert to Senegal; finding its western limit in the Cape de Verd Islands. Even there it retains many of its most desert types, as is shown by the flora of these islands containing twenty-nine genera common also to Aden and other parts of Arabia, and eleven species absolutely identical: a resemblance the more remarkable from the small number of species composing the Cape de Verd Flora. Webb, in the 'Spicilegia Gorgonica,' enumerates only 235 species of flowering plants, of which the following genera are represented at Aden. Those plants of which the specific name is given are identical in both floras.

Polygala triflora, *Linn.*
Mollugo.
Abutilon.
Corchorus Antichorus, *Roem.*
Grewia.
Fagonia cretica, *Linn.*
Zygophyllum simplex, *Linn.*
Zizyphus.
Indigofera.
Rhynchosia.
Cassia.
Acacia.
Citrullus colocynthis, *Schrad.*
Oldenlandia.
Vernonia.
Heliotropium.

Campylanthus.
Lavandula.
Statice.
Ærua Javanica.
Boerhaavia scandens, *Linn.*
Euphorbia.
Forskohlea.
Cyperus.
Tricholæna Teneriffæ, *Parlat.*
Panicum viride, *Linn.*
Pennisetum cenchroides, *Rich.*
Aristida Adscensionis, *Linn.*
Eragrostis ciliaris, *Link.*

[Read 21st June 1860.]

CONSPECTUS GENERUM FLORULÆ ADENENSIS.

Classis I. *DICOTYLEDONES.*

Subclassis I. **Thalamifloræ.**

Ordo I. CRUCIFERÆ.

Tribus I. Alyssineæ. *Silicula bivalvis, septo lato.*

1. Farsetia, *Turra.* *Calyx* clausus. *Stamina* tetradynama; filamentis edentulis. *Silicula* lineari-oblonga; valvis planis; septo venoso uninervio. *Semina* plura, marginata.

Tribus II. Isatideæ. *Silicula indehiscens.*

2. Dipterygium, *Decaisne.* *Corollæ* petala integra. *Stamina* tetradynama; filamentis edentulis. *Silicula* latere compressa, crustacea, dorso utrinque alata, unilocularis, monosperma.

Tribus III. Brassiceæ. *Siliqua septo lineari.*

3. Diplotaxis, *DC.* *Calyx* patens. *Stamina* tetradynama. *Siliqua* elongato-linearis, compressa; valvis uninerviis, membranaceis. *Stylus* conicus, brevissimus. *Semina* ovata, biseriata.

Ordo II. CAPPARIDACEÆ.

Tribus I. Cleomeæ. *Fructus capsularis.*

1. Cleome, *Linn.* *Stamina* 4–6, toro subgloboso inserta. *Stylus* brevissimus. *Capsula* siliquæformis, unilocularis, bivalvis; valvis deciduis, a septo seminifero solutis.

Tribus II. Cappareæ. *Fructus baccatus.*

2. Cadaba, *Forsk.* *Sepala* 4, biseriatim valvata. *Corollæ* petala

4 vel nulla. *Stamina* 4–5, apici tori stipiformis inserta. *Appendix* tubulosa, linguæformis, a basi tori exserens. *Ovarium* longe stipitatum. *Bacca* siliquæformis, subtorulosa.

3. Capparis, *Linn.* *Sepala* 4, in æstivatione imbricata. *Corollæ* petala 4. *Stamina* indefinita, toro parvo hemisphærico inserta. *Ovarium* stipitatum. *Bacca* globosa. *Semina* plurima, in pulpa immersa.

4. Mærua, *Forsk.* *Calyx* infundibuliformis ; tubo persistente, limbi lobis æstivatione valvatis, deciduis. *Corolla* nulla. *Stamina* plurima. *Bacca* siliquæformis, valde torulosa.

Ordo III. RESEDACEÆ.

1. Reseda, *Linn.* *Calyx* 6-partitus. *Petala* 5. *Stamina* 10–30. *Carpidia* 3. *Capsula* obovata, apice hians.

Ordo IV. POLYGALACEÆ.

1. Polygala, *Linn.* *Sepala* 5, duo lateralia (alis) latiora, petaloidea. *Corolla* irregularis, petala inferiore carinata. *Stamina* 8, monadelpha. *Capsula* membranacea, obovata, compressa, monosperma.

Ordo V. CARYOPHYLLACEÆ.

1. Mollugo, *Linn.* *Calyx* 5-partitus. *Petala* nulla. *Stamina* 5. *Stigmata* 3, linearia. *Capsula* trilocularis, obtuse trigona, loculicide trivalvis. *Semina* plurima.

2. Sphærocoma, *T. Anders.* *Calyx* 5-partitus, persistens. *Petala* 5, subhypogyna. *Stamina* 5. *Ovarium* uniloculare, biovulatum. *Stylus* solitarius ; stigmate bifido. *Utriculus* chartaceus, abortu monospermus.

Ordo VI. MALVACEÆ.

Tribus I. Hibisceæ. *Calyx involucello cinctus.*

1. Hibiscus, *Linn.* *Involucellum* 5–10-phyllum. *Calyx* 5-fidus. *Petala* 5, in æstivatione convoluta. *Tubus stamineus* columnæformis. *Ovarium* sessile, 5-loculare. *Semina* lanata vel sericea.

Tribus II. Sideæ. *Calyx involucello nullo, nudus.*

2. Abutilon, *Gärtn.* *Involucellum* nullum. *Ovarium* 8–10-loculare. *Cocca* trisperma.

Ordo VII. STERCULIACEÆ.

1. Sterculia, *Linn.* *Flores* unisexuales. *Calyx* coloratus, campanulatus. *Corolla* nulla. *Tubus stamineus* solidus, apice 10-lobatus. *Ovarium* stipitatum, carpellis 5. *Follicula* 4. *Semina* pauca.

Ordo VIII. TILIACEÆ.

1. Corchorus, *Linn.* *Sepala* 4, decidua. *Petala* 4, unguiculata. *Stamina* 8–10. *Capsula* quadrilocularis, quadrivalvis, polysperma.

2. Grewia, *Linn.* *Calyx* pentaphyllus. *Corollæ* petala 5, basi intus glandula vel foveola nectarifera instructa. *Stamina* plurima, apici stipitis brevis inserta. *Ovarium* quadriloculare. *Drupa* quadriloba, tetrapyrena.

Ordo IX. GERANIACEÆ.

1. Erodium, *L'Hér.* *Calyx* 5-partitus. *Petala* 5, caduca. *Stamina* 10, monadelpha, biseriata; 5 fertilia, 5 ananthera vel obsoleta, basi glandulis instructa. *Styli* 5, gynophoro longitudinaliter adnati. *Carpella* 5, abortu monosperma; stylis a gynophoro elastice et spiraliter solutis.

Ordo X. ZYGOPHYLLACEÆ.

1. Fagonia, *Tourn.* *Calyx* 5-partitus, deciduus. *Petala* 5, calyce longiora. *Stamina* 5, æqualia. *Capsula* pyramidalis, pentagona, pentacocca.

2. Zygophyllum, *Linn.* *Calyx* 5-partitus, deciduus. *Petala* 5, emarginata, calyce paulo longiora. *Stamina* 10, corolla breviora; filamentis subulatis, flexuosis; antheris ovatis. *Capsula* ovata, pentagona, 5-locularis.

Subclassis II. **Calyciflorae.**

Ordo XI. RHAMNACEÆ.

1. Zizyphus, *Tourn.* *Calyx* patens, 5-fidus. *Petala* 5, calycis

fauci inserta. *Discus* planus. *Stamina* 5, petalis opposita. *Ovarium* biloculare, in disco immersum. *Ovula* solitaria, erecta. *Styli* 2. *Fructus* carnosus. *Semina* erecta, compressa.

Ordo XII. TEREBINTHACEÆ.

1. BALSAMODENDRON, *Kunth.* *Flores* polygami. *Calyx* 4-dentatus, persistens. *Petala* 4, sub toro inserta, æstivatione valvatim induplicata. *Stamina* 8, cum petalis inserta. *Ovarium* biloculare. *Ovula* in loculis gemina. *Drupa* abortu sæpissime unilocularis, monosperma.

Ordo XIII. MORINGEÆ.

1. MORINGA, *Juss.* *Calyx* 5-partitus. *Petala* 5, duo longiora, æstivatione imbricata. *Stamina* 8–10, disco cupuliformi inserta; filamentis basi liberis, supra medium connatis, apice distinctis. *Ovarium* uniloculare; placentis parietalibus 3. *Fructus* leguminiformis, rostratus, torulosus, trivalvatus; valvis dissepimenta transversa gerentibus. *Semina* uniseriata, trigona.

Ordo XIV. LEGUMINOSÆ.

Subordo PAPILIONACEÆ.

Tribus I. LOTEÆ.

† Subtribus *Genisteæ.*

1. ARGYROLOBIUM, *Eck et Zey.* *Calyx* bilabiatus; labio superiore bi-, inferiore tridentato. *Vexillum* semiorbiculatum; *alæ* oblongæ; *carina* obtusa. *Stamina* monadelpha. *Legumen* lineari-ensiforme, subcompressum, utrinque acutum, stylo apiculatum, 6–10-spermum. *Flores* flavi.

†† Subtribus *Indigoferæ.*

2. INDIGOFERA, *Linn.* *Calyx* urceolato-campanulatus, 5-fidus. *Vexillum* subrotundatum, reflexum; *alæ* oblongæ, carinam æquantes; *carina* obtusa, gibba, basi utrinque calcarata. *Stamina* diadelpha. *Legumen* teretiusculum, oblongum, falcatum, 2–5-spermum. *Flores* coccinei.

††† Subtribus *Galegeæ.*

3. POGONOSTIGMA, *Boiss.* *Calyx* ebracteolatus, subæqualiter 5-

dentatus. *Vexillum* suborbiculatum, carinam alasque superans; *alæ* basi cum carina connexæ; *carina* acuta, incurva. *Stylus* incurvus; stigmate capitato, longe barbato. *Ovarium* biovulatum. *Legumen* ovatum, compressum, monospermum. *Flores* purpurei.

4. Tephrosia, *Pers.* *Calyx* ebracteolatus, subcampanulatus, 5-fidus, laciniis superioribus profundius fissis. *Vexillum* suborbiculatum, carinam et alas paulo superans. *Stamina* 10, monadelpha. *Stigma* pubescens. *Legumen* lineare, compressum, rectum. *Semina* 5–12, compressa.

Tribus II. Vicieæ.

Subtribus *Hedysareæ.*

5. Taverniera, *DC.* *Calyx* bibracteolatus. *Vexillum* subovatum; *alæ* calyce breviores; *carina* obtusa, vexillum æquans. *Stamina* 10, diadelpha. *Stylus* longus, flexuosus, filiformis. *Legumen* biarticulatum; articulis compressis, monospermis. *Flores* rosei.

Tribus III. Phaseoleæ.

Subtribus *Rhynchosieæ.*

6. Rhynchosia, *Lour.* *Calyx* bilabiatus; labio superiore bifido, inferiore trifido. *Vexillum* obovatum, alas liberas superans; *carina* falcata, rostrata. *Stamina* 10, diadelpha. *Legumen* membranaceum, compressum, falcatum, dispermum. *Semina* lævia, notata. *Flores* flavi.

Subordo Cæsalpineæ.

Tribus Cassieæ.

7. Cassia, *Linn.* *Calyx* pentaphyllus, deciduus. *Petala* 5, unguiculata, inæqualia. *Stamina* 10, inæqualia; filamentis liberis. *Legumen* compressum; septis transversis. *Semina* compressa, verticalia.

Subordo Mimoseæ.

Tribus Acacieæ.

8. Acacia, *Neck.* *Flores* polygami, hermaphroditi et masculi.

Corolla tubulosa aut campanulata, limbo 5-fido. *Stamina* numerosa, exserta; filamentis liberis. *Legumen* crassum, pulpa farctum, aut coriaceum, membranaceum, indehiscens vel vix dehiscens.

Ordo XV. CUCURBITACEÆ.

1. Cucumis, *Linn.* *Flores* monoici. Masc. *Calyx* campanulatus, 5-dentatus. *Stamina* 5, triadelpha, calyci inserta; antherarum loculis linearibus, infra apicem connectivi crassiusculi simplicis adnatis. Fem. *Calycis* tubus subglobosus; limbo 5-dentato. *Pepo* carnosus, sulcatus, verrucosus.

2. Citrullus, *Neck.* *Flores* monoici. Masc. *Calyx* profunde 5-fidus. *Stamina* 5, triadelpha, imæ corollæ inserta; antheris unilocularibus, loculo lineari, connectivi marginem dorsalem gyrose adnato. Fem. *Calycis* tubus globosus; limbo profunde 5-fido. *Pepo* globosus, lævis, carne solida.

Ordo XVI. PORTULACEÆ.

1. Trianthema, *Linn.* *Calyx* bracteolatus; tubo cum ovario connato; limbo 5-partito, intus colorato. *Corolla* nulla. *Stamina* 5. *Ovarium* uniloculare. *Stigma* abortu unicum, excentricum. *Capsula* subcylindrica, apice truncata, disperma, parte superiore circumscisse dissiliente. *Semina* subreniformia, rugosa.

2. Orygia, *Forsk.* *Calyx* 5-partitus, persistens. *Petala* plurima, ovali-oblonga, integerrima, tenerrima, calyce breviora. *Stamina* plurima, calyci inserta, partim cohærentia. *Ovarium* liberum, 5-loculare. *Stigmata* 5. *Capsula* chartacea, quinquevalvis. *Semina* plurima, reniformia, atra.

Ordo XVII. UMBELLIFERÆ.

1. Ptychotis, *Koch.* *Involucrum* oligophyllum. *Calycis limbus* 5-dentatus. *Petala* emarginata, bifida, cum lacinula inflexa. *Fructus* latere compressus, muricatus. *Mericarpia* 5-juga.

Ordo XVIII. RUBIACEÆ.

1. Oldenlandia, *Linn.* *Calycis* limbus 4-dentatus, dentibus in fructu erectis. *Corolla* tubulosa; limbo subrotato. *Capsula* subglobosa, apice rimula loculicide operta. *Semina* plurima.

Ordo XIX. COMPOSITÆ.

Subordo TubuliflORÆ. *Flores hermaphroditi. Corolla regularis.*

Tribus I. Vernoniaceæ. *Capitula multiflora, homogama, discoidea. Antheræ ecaudatæ. Flores cyano-purpurei.*

1. Vernonia, *Schreb. Involucrum* imbricatum, floribus brevius. *Receptaculum* nudum. *Corollæ* limbus 5-fidus. *Achenia* callo basilari cartilagineo. *Pappus* biserialis; series exterior paleacea; interior aristæformis, multo longior.

Tribus II. Asteroideæ. *Capitula multiflora, homogama. Antheræ basi caudatæ. Flores lutei.*

2. Varthemia, *DC. Involucrum* imbricatum, squamis adpressis acutis. *Receptaculum* alveolatum. *Corolla* tubulosa. *Achenia* oblonga, compressa, pubescentia. *Pappus* biserialis.

3. Iphiona, *DC. Involucrum* imbricatum; squamis adpressis, acuminatis, mucronatis. *Receptaculum* alveolatum. *Corollæ* tubus nullus. *Achenia* subcylindrica, sulcata, sparse hispida. *Pappus* rigidus, multiserialis; setis intimis corollam æquantibus.

4. Hochstetteria, *DC. Involucri* squamæ pluriseriales, subæquales, lineari-lanceolatæ. *Receptaculum* hirsutum. *Corolla* tubulosa. *Achenia* subturbinata, villosa; villis achenium superantibus. *Pappus* uniserialis; setis 10, dense ciliatis.

Subordo Liguliflorae. *Flores hermaphroditi, ligulati. Capitula pauciflora. Flores lutei.*

5. Brachyramphus, *DC. Involucrum* imbricatum; squamis acuminatis, margine scariosis. *Receptaculum* nudum. *Corolla* ligulata. *Achenia* oblonga, muricata, breviter rostrata. *Pappus* pluriserialis, pilosus, mollis, albus.

Subclassis III. **Corolliforæ.**

Ordo XX. APOCYNEÆ.

1. Adenium, *Rœm. et Sch. Calyx* 5-partitus. *Corolla* subinfundibuliformis, pubescens, intus lineis 5, villosis longitudi-

naliter notata. *Stamina* 5, brevissima, inclusa. *Antheræ* cum stigmate cohærentes. *Ovaria* 2, globosa. *Stylus* superne incrassatus; stigmate bidentato. *Succus* lacteus.

Ordo XXI. ASCLEPIADACEÆ.

1. Steinheilia, *Decaisne.* *Calyx* 5-partitus. *Corolla* campanulata, 5-fida; lobis acutis, erectis, contortis; fauce squamulis 5, flavidis, clausa; tubo basi foveolis 5, squamulis alternantibus. *Antheræ* membrana oblonga, stigmati incumbente, terminatæ. *Pollinia* pendula, subcompressa, clavata. *Stigma* muticum.

2. Glossonema, *Decaisne.* *Calyx* 5-partitus. *Corolla* subcampanulata, profunde 5-fida; lobis erectis paginaque superiore tuberculo carnoso instructis. *Pollinia* ovoidea, ad apicem funiculo geniculato affixa. *Stigma* 5-gonum. *Folliculus* ovoideus, spinis innocuis echinatus.

Ordo XXII. CONVOLVULACEÆ.

1. Convolvulus, *Linn.* *Calyx* pentaphyllus. *Corolla* campanulato-infundibuliformis; limbo 5-plicato. *Stamina* 5, imo corollæ tubo inserta, inclusa. *Ovarium* biloculare; loculis biovulatis. *Stylus* unicus; stigmatibus 2. *Capsula* bilocularis, bivalvis. *Semina* 4.

2. Cressa, *Linn.* *Calyx* pentaphyllus. *Corolla* infundibuliformis; limbo 5-partito, lobis planis. *Stamina* 5, exserta. *Ovarium* biloculare; loculis biovulatis. *Styli* 2. *Capsula* abortu monosperma.

Ordo XXIII. BORAGINEÆ.

1. Heliotropium, *Tourn.* *Calyx* 5-partitus. *Corolla* hypocraterimorpha; fauce nuda; limbo 5-fido. *Stamina* 5, corollæ tubo inserta. *Ovarium* quadriloculare; loculis uniovulatis. *Stylus* terminalis; stigmate peltato.

Ordo XXIV. SOLANACEÆ.

1. Lycium, *Linn.* *Calyx* urceolatus, 5-dentatus. *Corolla* infundibuliformis, tubulosa; limbo 5-fido, erecto. *Stamina* 5, medio corollæ inserta, inclusa. *Ovarium* biloculare. *Stylus* simplex; stigmate capitato, obsolete bilobo. *Bacca* subglo-

bosa, calyce persistente suffulta, bilocularis. *Semina* plurima, reniformia.

Ordo XXV. SCROPHULARINEÆ.

1. Anarrhinum, *Desf.* *Calyx* profunde 5-partitus. *Corolla* tubulosa; tubo incurvo, basi non calcarato; fauce pervia; limbo bilabiato. *Stamina* 4, didynama, cum rudimento quinti sterilis. *Antheræ* reniformes, uniloculares. *Capsula* bilocularis, chartacea, polysperma; loculis sub apice poro dehiscentibus.

2. Anticharis, *Endl.* *Calyx* 5-partitus. *Corolla* tubulosa; fauce elongata, ampla; limbo 5-fido. *Stamina* 2, antica, inclusa. *Capsula* ovata, subrostrata, bisulca, loculicide bivalvis; valvulis demum fissis. *Columna* placentifera integra.

3. Lindenbergia, *Lehm.* *Calyx* campanulatus, semifidus. *Corolla* bilabiata; labio superiore erecto, inferiore trilobo, palato biplicato. *Stamina* 4, fertilia; antherarum loculis disjunctis. *Capsula* ovoidea, bisulca, loculicide bivalvis; valvulis integris. *Columna* placentifera 4-partibilis.

4. Campylanthus, *Roth.* *Calyx* 5-partitus. *Corollæ* tubus elongatus, incurvus; limbo patente, subæquali. *Stamina* 2, inclusa; antherarum loculis mucronatis. *Capsula* bilocularis, ovato-compressa, septicide dehiscens.

Ordo XXVI. ACANTHACEÆ.

1. Blepharis, *Pers.* *Calyx* 5-partitus, inæqualis; lacinia infera bidentata. *Corolla* unilabiata; labio 5-fido; fauce cartilaginea. *Stamina* 4; antheris unilocularibus, margine ciliato-barbatis; filamentis inferis supra antheras prolongatis. *Capsula* 4-sperma. *Semina* testa floccosa. *Spicæ* spinosæ, imbricato-bracteatæ.

Ordo XXVII. VERBENACEÆ.

2. Bouchea, *Cham.* *Calyx* tubulosus, plicatus. *Corolla* infundibulari-hypocraterimorpha; limbo oblique sub-bilabiato. *Stamina* 4, didynama, inclusa; antherarum loculis oppositis. *Capsula* dicocca, calyce inclusa; coccis elongatis, unilocularibus, multistriatis.

Ordo XXVIII. LABIATÆ.

1. Lavandula, *Tourn.* *Calyx* ovato-tubulosus, subæqualiter 5-dentatus, 15-nervius. *Corollæ* tubus exsertus; limbo oblique bilabiato. *Stamina* 4, tubo corollæ inclusa, declinata; filamentis glabris, liberis. *Nuculæ* 4, glabræ. *Flores* in spicis nudis terminalibus.

Ordo XXIX. PLUMBAGINEÆ.

1. Statice, *Willd.* *Calyx* scariosus, 5-costatus. *Corolla* ima basi tantum gamopetala. *Stamina* 5, petalis opposita. *Styli* 5, staminibus alterni; stigmatibus filiformibus, cylindricis. *Utriculus* unilocularis, monospermus, membranaceus, indehiscens.

Ordo XXX. SALVADORACEÆ.

1. Salvadora, *Linn.* *Sepala* 4, parva. *Corolla* membranacea, 4-partita. *Stamina* 4, perigyna, corollæ lobis alterna; antheris introrsis, bilocularibus. *Stigma* sessile, simplex. *Bacca* monosperma. *Semen* erectum.

Subclassis IV. **Monochlamydeæ.**

Ordo XXXI. PHYTOLACCEÆ.

1. Limeum, *Linn.* *Calyx* profunde 5-partitus, herbaceus, margine membranaceus, laciniis subæqualibus. *Petala* distincta 3–5. *Stamina* 6–7, petalis alterna, disco perigyno inserta; antheris versatilibus. *Ovarium* biloculare. *Styli* 2. *Capsula* dicocca. *Cocci* monospermi, compressi, tuberculati.

Ordo XXXII. SALSOLACEÆ.

1. Traganum, *Del.* *Calyx* 5-fidus, demum crasso-induratus, laciniis apteris. *Corolla* nulla. *Stamina* 5, toro inserta. *Filamenta* crassa. *Torus* (nectarium) inter stamina et pistillum, carnosus, obtuse 5-gonus. *Styli* 2, subulato-filiformes. *Utriculus* depressus, monospermus, indehiscens, calyce reconditus. *Caulis* articulatus. *Folia* succulenta.

Ordo XXXIII. AMARANTACEÆ.

1. Ærva, *Forsk.* *Flores* tribracteati, laterales, abortivi nulli. *Perigonium* pentaphyllum, lanatum. *Stamina* 5, basi in cupu-

lam connata. *Antheræ* introrsæ, biloculares. *Staminodia* 5, dentata. *Stylus* subsessilis; stigma bifidum. *Utriculus* evalvis, monospermus.

2. Saltia, *R. Br.* *Flores* tribracteati, abortivi 1–2. *Perigonium* (calyx) pentaphyllum. *Stamina* 5; filamentis subulatis compressis, basi in cupulam connatis. *Stylus* simplex; stigmate capitato globoso. *Ovarium* uniovulatum.

Ordo XXXIV. PARONYCHIACEÆ.

1. Cometes, *Burm.* *Flores* ternati. *Bracteæ* demum plumoso-pinnatifidæ. *Calyx* herbaceus, 5-partitus; segmentis spinoso-mucronatis. *Corolla* nulla. *Stamina* 5; filamentis subulatis, basi in cupulam subhypogynam connatis. *Staminodia* (petala) 5, linearia, staminibus alternis. *Utriculus* membranaceus, monospermus, indehiscens. *Semen* erectum.

Ordo XXXV. NYCTAGINEÆ.

1. Boerhaavia, *Linn.* *Perigonium* coloratum, tubulosum; limbo plicato, deciduo. *Stamina* 3, subinclusa vel exserta. *Ovarium* uniloculare, uniovulatum. *Stylus* simplex; stigma obtusum. *Fructus* (achenium) perigonii tubo inclusus, angulato-costatus. *Semen* erectum; testa cum endocarpio connata.

Ordo XXXVI. EUPHORBIACEÆ.

1. Euphorbia, *Linn.* *Flores* monoici, involucro communi dentato inclusi. *Calyx* et *corolla* nulla. Masc. plures, stamine unico, filamento articulato glandulaque minuta consistentes. Fem. unicus, centralis, longius stipitatus. *Ovarium* triloculare. *Styli* tres, distincti vel plus minus coaliti, bifidi. *Capsula* tricocca; coccis monospermis.

2. Crozophora, *Neck.* *Flores* monoici. Masc. *Calyx* 5-partitus, æstivatione valvatus. *Petala* 5, æstivatione convoluta. *Stamina* 8–10; filamentis basi coalitis; antheris extrorsis. Fem. *Calyx* 10-partitus. *Corolla* nulla. *Ovarium* sessile. *Styli* 3, bifidi. *Capsula* tricocca; coccis monospermis.

3. Jatropha, *Linn.* *Flores* monoici. Masc. *Calyx* 5-partitus; segmentis æstivatione convolutis. *Petala* 5, æstivatione convoluta, cum glandulis 5 alternantia. *Stamina* 8; antheris introrsis. Fem. *Calyx* et corolla nulla. *Ovarium* glandulis

(petalis) cinctum. *Styli* 3, distincti. *Stigmata* peltata, undulata. *Capsula* tricicocca; coccis monospermis.

Ordo XXXVII. URTICACEÆ.

1. Forskohlia, *Linn.* *Flores* androgyni, in receptaculo lanato involucro communi cincto. Masc. *Perigonium* monophyllum. *Stamen* unicum; filamentum elastice prosiliens; anthera extrorsa. Fem. *Perigonium* ventricosum, lanatum. *Ovarium* uniloculare, uniovulatum. *Stylus* simplex. *Stigma* lineare, unilaterale.

Ordo XXXVIII. GNETACEÆ.

1. Ephedra, *Tourn.* *Flores* dioici; bracteis decussatim oppositis. Masc. *Perigonium* membranaceum, tubulosum, apice bivalve. *Stamen* unicum; anthera bilocularis; loculis apice poro dehiscentibus. Fem. *Perigonium* nullum. *Ovarium* apice pervium, uniloculare, uniovulatum. *Drupa* baccata, monosperma.

Classis II. *MONOCOTYLEDONES.*

Ordo XXXIX. AMARYLLIDEÆ.

1. Pancratium, *Linn.* *Perigonium* superum, infundibuliforme, corollinum; tubo elongato; limbo regulariter 6-partito. *Corona* faucis tubulosa, exserta, dentata. *Stamina* 6, 3 sterilia, in coronam faucis connata. *Ovarium* triloculare, multiovulatum.—*Herbæ* scapigeræ; radice bulbosa.

Ordo XL. CYPERACEÆ.

1. Cyperus, *Linn.* *Spiculæ* multifloræ, compressæ, terminales umbellatæ; involucro communi 3–4-phyllo; glumis distiche imbricatis. *Glumæ* unifloræ. *Aristæ* hypogynæ, ovarii nullæ. *Stamina* 2–3. *Stylus* trifidus.

Ordo XLI. GRAMINEÆ.

Tribus I. Paniceæ. *Spiculæ bifloræ.*

1. Tricholæna, *Schrad.* *Spiculæ* bifloræ, laxe paniculatæ. *Gluma* florifera mutica. *Palea* binervia, obtusa. *Lodiculæ* 2, distinctæ. *Stamina* 3. *Styli* 2; stigmata plumosa.
2. Panicum, *Linn.* *Spiculæ* subbifloræ, dense spicæformes. *Glumæ* exteriores 3, plerumque vacuæ 4–6-nerviæ. *Gluma*

florifera concava, enervis. *Lodiculæ* 2, carnosæ, truncatæ, obtusæ. *Stamina* 3. *Styli* 2.

3. PENNISETUM, *Pal. de Beauv.* *Spiculæ* bifloræ, in spicas cylindricas, densas, aristatas, confertæ. *Gluma* florifera membranacea, concava, mutica, paleam complectens. *Lodiculæ* 2, fere obsoletæ. *Stamina* 3. *Styli* 2, basi paulo connati.

Tribus II. STIPACEÆ. *Spiculæ unifloræ. Gluma florifera aristata. Ovarium stipitatum.*

4. ARISTIDA, *Linn.* *Glumæ* 2, membranaceæ, inæquales. *Gluma* florifera coriacea, teres, involuta, apice aristata; arista trifida. *Palea* membranacea, mutica. *Lodiculæ* 2, integræ. *Stamina* 2. *Styli* 2, distincti.

5. STIPAGROSTIS, *Nees.* *Glumæ* 2, membranaceæ, subæquales. *Gluma* florifera chartacea, membranacea, apice biloba, inter lobos aristata; arista trifida. *Palea* obtusa. *Lodiculæ* 2, spathulato-cochleariformes.

Tribus III. CHLORIDEÆ. *Spiculæ quadrifloræ vel multifloræ. Glumæ et paleæ aristatæ; aristæ tortæ. Ovarium sessile.*

6. TETRAPOGON, *Desf.* *Flores* inferiores 2, hermaphroditi; superiores 2, imperfecti. *Glumæ* 2, carinatæ; superior mutica, inferior aristata. *Gluma* florifera trinervia, carinata, sub apice aristata. *Palea* bicarinata, aristata. *Lodiculæ* 2, integræ.

7. DACTYLOCTENIUM, *Willd.* *Flores* distichi, hermaphroditi. *Glumæ* 2, carinatæ, compressæ; superior aristata, inferiorem complectens. *Gluma* florifera carinata, sub apice mucronata. *Palea* bicarinata. *Lodiculæ* 2, emarginatæ.

Tribus IV. FESTUCEÆ. *Spiculæ multifloræ. Ovarium sessile.*

8. ERAGROSTIS, *Pal. de Beauv.* *Spiculæ* compressæ, paniculatæ. *Gluma* florifera membranacea, trinervia, carinata, decidua. *Palea* bicarinata, persistens; carinis ciliatis. *Caryopsis* libera.

9. ÆLUROPUS, *Trin.* *Spiculæ* compressæ, spicato-racemosæ. *Gluma* florifera coriacea, multinervia, ecarinata, margine membranacea. *Palea* bicarinata.

FLORULA ADENENSIS.

Classis I. DICOTYLEDONES.

Ordo I. CRUCIFERÆ.

1. FARSETIA, *Turra*.

1. F. STYLOSA (*T. Anders.*). Pilis adpressis incana; foliis paucissimis, linearibus, basi attenuatis; sepalis lineari-lanceolatis, margine scariosa, glabra, angusta; siliquis breviter pedunculatis, linearibus, subincanis, stylo apiculatis; stylo 1 lin. longo.—*Mathiola stylosa*, Hochst. et Steud. in Schimper, Pl. Arab. Fel. n. 860.

Hab. Aden, in arenosis (*Hook. fil. et T.!*).

Distr. In deserto Arabiæ Felicis!

Decaisne, in Ann. Sc. Nat. ser. 2. vol. iv. p. 69, describes another species, *F. longisiliqua*, from Yemen, but of which Walpers, in Repert. vol. i. p. 139, says, "Non hujus generis esse videtur." I have not seen this plant. *F. linearis*, Dcne. MSS. in Herb. Mus. and Boiss. in Ann. Sc. Nat. ser. 2. vol. xvii. p. 150, I distinguish from *F. stylosa* by its smaller flowers, ovate-lanceolate sepals, and much longer styles. I have seen specimens of it from Muscat and Algiers.

2. DIPTERYGIUM, *Decaisne*.

1. D. GLAUCUM (*Dcne. in Ann. Sc. Nat.* ser. 2, iv. p. 67). Foliis petiolatis, ovatis vel lanceolatis, integris, herbaceis, glabris, vel crassiusculis scabridis; sepalis æqualibus, lanceolatis, obscure trinerviis, extrorsum glandulosis; petalis lanceolatis, obtusis, unguiculatis, sepalis longioribus; stylo tereti, stigmate capitato; ovario sessili, tetraquetro, angulis dentato-alatis; siliculis indehiscentibus, compressis, elliptico-oblongis, scorbiculatis, crustaceo-corrugatis.—*D. scabrum*, Decaisne, fide Boiss. in Auch. Pl. Arab. n. 4150 (absque descriptione). *Pteroloma Arabicum*, Hochst. et Steud. in Schimp. Pl. Arab. Fel. n. 851.

Hab. Aden, a littore usque ad alt. 1000 ped. in monte "Jibeel Shumshum" (*Hook. fil.! T. Anders.*).

Distr. In Arabia Felici! et Petræa! Nubia! Scinde! Punjab!

Herba perennis, subvirgata, glabra vel scabrido-glutinosa, subaphylla.

Ramuli teretes, rigidi, diffusi. *Folia* 2–10 lin. longa, 1–3 lin. lata. *Sepala* interdum glabra, 1 lin. longa; juniora violacea. *Petala* demum subdeflexa, viridescentia aut alba. *Siliculæ* alis cristatis; duæ laterales majores, duæ antica et postica minores inconspicuæ; uniloculares, abortu monospermæ.

3. Diplotaxis, *DC.*

1. D. pendula (*DC. Syst.* vol. ii. p. 630, et *Prod.* i. p. 222). Foliis obovatis, lanceolatis, grosse dentatis, hispidis; sepalis ovatis, tomentosis; siliquis pedicellatis, pendulis, glabris, linearibus, basi attenuatis; stylo brevissimo, stigmate bilabiato.—*D. crassifolia, D. Lagascana, D. hispida* (DC. in Syst. atque Prod. *l. c.*). *D. nana* (Boiss.).

Hab. Aden, in arenosis sterilibus (*Hook. fil.* !).

Distr. In Arabia Felici! et Petræa, Ægypto! Syria! Persia! Algeria! Hispania! Sicilia!

Herba in hirsutia foliorumque forma multum varians; corolla et siliquis exceptis, plerumque hispida. *Corolla* flava, magna.

Ordo II. CAPPARIDACEÆ.

Tribus I. Cleomeæ, *Linn.*

1. Cleome, *Linn.*

Sect. *Pedicellaria.* Torus carnosus; thecaphorus elongatus.

1. C. paradoxa (*R. Br. in Salt. Abyss.*; *DC. Prod.* vol. i. p. 241). Caule basi suffruticoso, erecto, glabro, apice glandulis nigris scabro; foliis 3–6-foliolatis; foliolis linearibus, lanceolatis, acutis, mucronatis, glaucis; petiolis foliolis duplo longioribus, muricatis; racemis terminalibus, in fructu elongatis, laxis, subaphyllis; pedunculis thecaphorisque glandulosis, scabris; sepalis ovatis, glandulosis; petalis unilateralibus, apice et marginibus glandulosis, duobus majoribus spathulatis, duobus brevioribus breviter unguiculatis; staminibus 6; stylo brevi, crasso, basi glanduloso; stigmate obtuso; siliquis stipitatis, linearibus, utrinque acutis, glabris, venosis; seminibus biseriatis, glabris, globosis.—*C. muricata*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1212.

Hab. Aden, ubique in arenosis (*Edgeworth, Hook. fil. et T.*! *Madden*! *T. Anders.*).

Suffrutex perennis, 2–3-pedalis, glaucus, apice glanduloso-scaber, foliosus, ramosus. *Foliola* 1–1½ unc. longa. *Petiolus* foliolo triplo longior. *Flores* magni, flavi. *Siliqua* 4½ lin. longa, pendula; valvis planis 4 lin. latis.

Sect. *Siliquaria.* Torus parvus; thecaphorus brevis vel nullus.

† *Foliis simplicibus.*

2. C. QUINQUENERVIA (*DC. Prod.* i. p. 239). Herbacea, glauca, subpubescens aut glanduloso-hirsuta; foliis longe petiolatis, ovatis, basi subcordatis, 5-nervibus, floralibus minoribus; floribus axillaribus; sepalis linearibus, pubescentibus, margine ciliatis; petalis ovatis; staminibus 6; stylo gracili, glabro; stigmate rotundo, obtuso; siliquis sessilibus, ovato-oblongis, glanduloso-scabris, stylo brevi apiculatis.

Hab. Aden, in arenosis prope littus (*Madden*!).

Distr. In Persia! Affghanistan!

Herba annua. *Folia* longe petiolata, late ovata. *Siliqua* erecta, 1 unc. longa, subteres. *Stylus* brevis, 1 lin. longus. *Flores* pallide flavi.

3. C. PRUINOSA (*T. Anders.*). Caule ramosissimo, subglabro; ramis pruinosis, pilis patentibus subhirsutis, foliosis; foliis petiolatis, ovatis, acuminatis, trinerviis, papillis scabris sparse hirsutis, marginibus glandulosis subserratis; floribus axillaribus solitariis; sepalis lanceolatis, subglandulosis; petalis linearibus, unguiculatis; staminibus 4; siliquis sessilibus, erectis, glandulosis, teretibus, oblongis, stylo persistente deflexo apiculatis.

Hab. Aden, copiossisime (*Hook. fil.*! *T. Anders.*).

Suffrutex parvus, apice glandulosus, sparse pilosus. *Folia* longe petiolata, 4–8 lin. longa, 3–6 lin. lata; petiolus $\frac{3}{4}$ unc. longus. *Stylus* gracilis, glaber, 4 lin. longus. *Siliqua* glandulosa, longitudinaliter sulcata, 8 lin. longa. *Flores* viridi-flavi.

A species very near *C. droseræfolia*, but differing from it in being almost glabrous, in the shape of the leaves, and in the shorter styles. It may eventually prove to be a state of *C. droseræfolia*, especially as that plant has not been found at Aden, though it is common in Arabia Petræa, and Egypt.

4. C. PAPILLOSA (*Steud. Nomencl.* ed. 2, i. p. 382). Herbacea, gracilis; caule erecto, pilis patentibus hirsutis; foliis ovatis, basi subcordatis, margine integro, pilis strigosis papillisque duris scabris, inferioribus longe petiolatis, superioribus sessilibus; racemis laxis; floribus pedunculis filiformibus; sepalis lanceolatis, glandulosis; petalis lanceolatis, longe unguiculatis; staminibus 6; siliquis glabris, filiformibus, teretibus, patentibus, pedicello multo longioribus, transversim corrugatis, rubris; seminibus uniseriatis.—*C. gracilis*, Edgew. in Journ. Soc. Asiat. Bengal. vol. xvi. p. 1212. *C. linearis*, Stocks, MSS. in Herb. Hook.

Hab. Aden, in locis saxosis (*Edgew.*, *Hook. fil.*! *T. Anders.*).

Distr. In Abyssinia! Scinde! Punjab!

Herba gracilis, annua, aromatica, odore moschato. *Folia* integra. *Corolla* junioribus violacea, interdum flava. *Siliqua* glabra, filiformis, 1 unc. longa.

†† *Foliis trifoliolatis.*

5. C. BRACHYCARPA (*Vahl*, ined.; *DC. Prod.* i. p. 240). Caule ramoso, suberecto, glanduloso, apice scabro; foliis 3–5-foliolatis, petiolatis; foliolis ovatis, oblongis; floralibus sessilibus, 3-foliolatis vel integris; floribus laxe racemosis, pedicellatis; sepalis lanceolatis, petalis multo brevioribus, glandulosis; petalis ovatis, unguiculatis, glabris; staminibus 6; stylo erecto, glabro, siliqua dimidio breviore; stigmate rotundo; siliquis ovatis, glandulosis, patentibus, demum erectis, stylo capitatis. —*C. Vahliana*, Fresen. Mus. Senckenb. ii. p. 110. *C. diversifolia*, Hochst. et Steud. in Schimp. Pl. Arab. Fel. n. 762. *C. moschata*, Stocks, MSS. in Herb. Hook.

Hab. Aden, in arenosis vulgatissime (*Edgew., Madden, Hook. fil., T. Anders.*).

Herba annua? suberecta, ramis diffusis. *Pedicelli* graciles, siliqua fere duplo longiores. *Flores* flavi.

Tribus II. CAPPARIDEÆ.

2. CADABA, *Forsk.*

1. C. GLANDULOSA (*Forsk. Descr.* p. 68). Foliis subrotundis, ovalibus, mucronatis vel obtusis, crassiusculis, hirsutis, glandulosis; racemis terminalibus paucifloris, floribus pedunculatis; sepalis spathulatis, glandulosis; petalis nullis; staminibus 5, filamentis glabris; toro ligulæformi, petaloideo, staminibus longiore; ovario stipitato, glanduloso; stigmate sessili; capsulis ovato-oblongis, pedicellatis, glanduloso-hirsutis.—*Strœmia glandulosa*, Vahl, Symb. vol. i. p. 20. *Cadaba monopetala*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1212.

Hab. Aden, in monte "Jibeel Shumshum" dicto, ad altitudinem 1000 ped. (*Edgeworth, Hook. fil. et T.! T Anders.*).

Distr. In regione Tehama Arabiæ Felicis.

Frutex apice hirsutus, viscosus, ramosissimus. *Folia* integerrima, petiolata, 4–10 lin. longa, 3–6 lin. lata, petiolum æquantia. *Flores* apetali. *Capsula* baccata, semipollicaris.

2. C. LONGIFOLIA (*DC. Prod.* i. p. 244). Fruticosa, ramosa, glabra; foliis linearibus, oblongis, glabris, coriaceis; racemis terminalibus; floribus pedunculatis; sepalis 4, cruciatis, duobus majoribus exterioribus ovatis acutis, interioribus ovatis; petalis 4, lanceolatis, unguiculatis, minutis; staminibus 4; toro elongato; ovario stipitato, glanduloso; capsula baccata; seminibus teretibus, glandulosis.—*Strœmia longifolia*, R. Br. in Append. Salt. Abyss. n. 64.

Hab. Aden (*Hook. fil.! T. Anders.*).

Distr. In Abyssinia!

Frutex ramosus, glaber, foliis petiolis pedunculis sepalis ramisque junioribus minutissime pruinosis. *Folia* $1\frac{1}{2}$–2 unc. longa. *Torus* elongatus, 8 lin. longus, stipitem æquans. *Flores* violacei?

In the Hookerian Herbarium there is a glabrous specimen of *Cadaba Indica*, Lam., which, except by its having the pale-yellow flowers of that species, I cannot distinguish from some broad-leaved herbaceous specimens of *C. longifolia* from Aden. The normal states of *C. longifolia* and *C. Indica* are, however, markedly different.

3. Capparis, *Linn.*

1. C. galeata (*Fresen. in Mus. Senck.* ii. p. 111). Fruticosa, glauca, ramis diffusis, foliosis; foliis petiolatis, ovatis, crassis, mucrone recurvo uncinatis; stipulis duabus, spinosis; floribus solitariis, axillaribus; pedunculo foliis longiore, erecto, in fructu deflexo; sepalis 4, sepalo maximo galeato; petalis subrotundis, glabris; staminibus numerosis; fructu baccato, pyriformi, angulato; thecaphoro longo, pedunculum æquante; seminibus reniformibus, testa crustacea.—*C. Murrayana*, Grah. Cat., et Wight, Icones, t. 379. *C. cartilaginea*, Dcne. in Ann. Sc. Nat. ser. 2. vol. iii. p. 273. *C. uncinata*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1213.

Hab. Aden, in rupibus (*Edgew.*, *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Ægypto! Scinde! in ora occidentali peninsulæ Indiæ orientalis.

Frutex glaucus, ramis junioribus pulverulentis, *stipulis* aurantiacis uncinatis. *Folia* cartilaginea, 1½–2 unc. longa, 1–2 unc. lata; petiolus foliis brevior. *Petala* et stamina alba, denique pallide purpurea aut purpureo-rubra. *Fructus* maturus ruber, 8–10-costatus, 4 unc. longus, 1½ unc. latus. *Stipes* 2 unc. longus.

It is impossible to distinguish this plant by any essential characters from states of that protean species *Capparis spinosa*, L.

To *Capparis spinosa* I unite *C. Ægyptiaca*, Lam., *C. herbacea*, Willd., *C. ovata*, Bieber, *C. rupestris*, Linn., *C. obovata*, Royle, *C. ovata*, Desf., *C. mucronifolia* and *C. parviflora*, Boiss., *C. Sicula*, Guss. In all of these so-called species, and especially in *C. herbacea* and *C. rupestris*, specimens are constantly occurring in which the slightly recurved mucro of the leaf, the large flowers with a more or less galeate sepal, large-angled fruit, and the glaucous state of the whole plant indicate an affinity to *C. galeata*. As, however, some of the steps are wanting, I have for the present kept *C. galeata* distinct from *C. spinosa*.

4. Mærua, *Forsk.*

1. M. Thomsoni (*T. Anders.*). Virgata, glaberrima; foliis linearibus, oblongis, coriaceis, mucronatis, brevi-petiolatis; floribus solitariis, pedunculatis; calyce tubuloso, brevissime 4-partito; fructu carnoso, stipitato, glabro, toruloso.

Hab. Aden (*Hook. fil. et T.*!).

Frutex glaberrimus, virgatus, foliosus, ramis paucissimis, cortice punctato. *Folia* in ramis floriferis fasciculata oblonga, in aliis alterna linearia. *Thecaphorus* pedunculo longior.

Ordo III. RESEDACEÆ.

1. Reseda, *Linn.*

1. R. amblyocarpa (*Fresen.*). Subpruinosa; foliis integris, superioribus rarissime ternatim incisis, ovato-lanceolatis, basi attenuatis; floribus spicatis; bracteis deciduis, longe subulatis; pedicellis calycem æquantibus vel longioribus; sepalis 6, inæqualibus, linearibus, deciduis; petalis 5, duobus majoribus 5–10-partitis, tribus brevioribus bipartitis vel integris; capsulis obovatis, obtuse tridentatis; seminibus minutis, reniformibus, nigris, asperulis.

Hab. Aden, juxta mare (*Edgew.*, *Hook. fil. et T.*! *Madden*! *Schomburgk*! *Harvey*! *T. Anders.*).

Distr. In Abyssinia!

Herba ramosa, subpruinosa. *Caulis* perennis, striatus, angulosus. *Folia* plerumque integra, utrinque acuta, in petiolum attenuata, 2 unc. longa, 3 lin.–½ unc. lata. *Flores* parvi, bracteis deciduis. *Capsula* tridentata, truncata. *Semina* pauca, nigra, asperula, punctata.

After a careful examination of the species of *Reseda* in the Hookerian Herbarium, and the study of Mueller's elaborate monograph of the order, I can find no character, except the nature of the seeds, to separate this species from *R. pruinosa*, Del., or *R. Aucheri* and *R. bracteata*, Boiss., which seem to be merely varieties of *R. pruinosa*.

Having made numerous dissections of all the species allied to *R. pruinosa*, Del., I am convinced that no specific character of the slightest value can be obtained from the number of the divisions or the shape of the petals. I consider *R. amblyocarpa*, Fresen., to be probably distinct from *R. pruinosa*, Del., and its varieties,—from its having a perennial stock, almost always entire leaves, a larger and denser spike, smaller flowers, and a slightly different capsule containing much smaller, black and punctate seeds. *Reseda pruinosa* is evidently an annual, with generally trifid leaves; it has shorter spikes, larger flowers, and seeds nearly as large again as those of *R. amblyocarpa*, of a dark olive colour, and with an almost perfectly smooth testa. Both, however, are pruinose. The seeds of *R. pruinosa* are also sometimes slightly punctate, and *R. Aucheri*, Boiss., which ranks only as a variety of *R. pruinosa*, has often leaves as entire as those of *R. amblyocarpa*. In *Resedaceæ* the duration of the stock is probably an uncertain character, subject to the influence of climate, and especially to the amount of moisture.

Ordo IV. POLYGALACEÆ.

1. Polygala, *Linn.*

1. P. triflora (*Linn. Fl. Zel.* p. 269). Caule erecto, pubescente pilis adpressis; foliis subsessilibus, ovato-oblongis, apice rotundatis, utrinque incano-tomentosis; floribus breviter racemosis; racemis pedunculatis,

sessilibus, 4–6-floris; alis obovatis obtusis, pubescentibus, capsula paulo longioribus; carina cristata, rosea; capsulis oblongis, marginatis vel emarginatis, ciliatis; seminibus pilosis.—*P. paniculata*, Forsk. Fl. Arab. n. 429. *P. obtusata*, DC. Prod. i. p. 326. *P. erioptera*, DC. *l. c.* *P. Vahliana*, DC. *l. c.* *P. arvensis*, Willd. sp. 3. p. 876. *P. Rothiana*, W. et A. Prod. Fl. Pen. Ind. Or. p. 37. *P. glaucoides*, Wight in Wall. Cat., sed non Linn. *P. grandiflora*, Wall. Cat. *P. serpyllifolia*, Poir. Wall. Cat. *P. Noucherensis*, Camb. in Voy. Jacq. iv. p. 24. *P. Arabica*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1213.

Hab. Aden, in arenosis depressis (*Edgew.*! *Hook. fil.*! *Madden*! *T. Anders.*).

Distr. In Arabia Felici! Muscat! India orientali! Ægypto superiore! Abyssinia! Africa centrali! Senegal! insulis Capitis Viridis!

Ordo V. CARYOPHYLLACEÆ.

1. Mollugo, *Ser.*

1. M. Cerviana (*Ser. MSS.*; *DC. Prod.* i. p. 392). Glabra, caulibus adscendentibus, teretibus, verticillatis; foliis glaucis, in verticillis irregularibus confertis, radicalibus oblongis obtusis, caulinibus linearibus; floribus 2–3, umbellatis; pedunculis elongatis, gracilibus; petalis nullis; staminibus quinque, seminibus glabris.—*Pharnaceum Cerviana*, Linn. Spec., ed. 1, p. 272.

Hab. Aden, in umbris arbuscularum atque in arenosis (*Hook. fil.*! *T. Anders.*).

Distr. In pen. Indiæ orientalis! Punjab! Ceylania! Siberia australi! Abyssinia! Senegal! Europa australi! capite Bonæ Spei!

Herba tenera, glauca. *Caules* teretes, 1–4-unciales; verticilla caulina foliorum 2–3-foliata.

2. Sphærocoma, *T. Anders.*

1. S. Hookeri (*T. Anders. in Journ. Proc. Linn. Soc.* v. p. 15). Caule erecto, lignoso, ramoso, cortice glauco; foliis in nodis oppositis, caulinis fasciculatis, carnosis, teretibus, apice obtusis, basi attenuatis; glomerulis pedunculatis, ebracteatis; floribus dense aggregatis; sepalis ovatis, concavis, mucronatis, florum sterilium linearibus, in fructu setaceis, setis integris; capsula, calyce et corolla squamis persistentibus inclusis.

Hab. Aden (*Hook. fil.*).

Fruticulus 2-pedalis, ramosus, glaberrimus, glaucus; caulis nodis oppositis foliosis. *Folia* 6–10 lin. longa. *Glomeruli* fusci, 1–3 lin. longi. *Pedunculi* erecti, 1–1½ lin. longi, bracteis 1–2, sepaloideis. *Utriculus* parvus, subchartaceus.

Ordo VI. MALVACEÆ.

1. Hibiscus, *Linn.*

Sect. *Bombicella.*

1. H. Welshii (*T. Anders.*). Caule suffruticoso, glanduloso, punctato, foliis petiolatis, late ovatis, 3–5-lobatis, cordatis, margine dentato-serratis, glandulis nigris utrinque punctatis; petiolis superne hirsutis; pedunculis axillaribus, solitariis, unifloris, petiolum æquantibus, supra articulum incrassatis; involucello 10-phyllo, segmentis subulatis parvis; calyce 5-dentato, nigrescente, glandulis hirsutis obtecto; carpellis lanceolatis, pilis sparsissimis puberulis, extus cortice glanduloso reticulato; seminibus pilis fulvis, dense gossypinis.

Hab. Aden, rarissime (*Hook fil. et T.! T. Anders.*).

Suffrutex glandulosus. *Cortex* subglaucus. *Folia* glandulis asperis scabra, ½–1 unc. longa, ½–1½ unc. lata; petiolus 1–2 unc. longus. *Corolla* ignota.

I have named this very distinct species after my friend Dr. Welsh of the Bombay Army, the Civil Surgeon of Aden. I am much indebted to him for his kindness in accompanying me during my herborizations, and in showing me many of the rarer plants of the settlement, and among them this species.

Tab. I. Fig. 1, portion of leaf; 2, flower-bud; 3, section of the same; 4, sepal; 5, anthers; 6, single anther, showing mode of dehiscence; 7, cross section of ovary; 8, outer surface of a single carpel; 9, seed; 10, section of same; 11, embryo. With the exception of fig. 9, all are magnified.

2. H. micranthus (*Linn. fil. Suppl.* p. 308). Suffruticosus, caule pilis stellatis aspero; foliis petiolatis, ovatis, subrotundis, indivisis, acute serratis, scabris; pedicellis axillaribus, foliis longioribus; involucello 5–7-phyllo, setaceo; calyce breviore; corolla reflexa; capsula subglobosa; seminibus sericeis.—*H. rigidus*, Linn. fil. Suppl. p. 310. *H. ovalifolius*, Vahl, Symb. i. p. 50. *Urena ovalifolia*, Forsk. Descr. p. 124. *H. clandestinus*, Cav. Ic. i. p. 1, t. 2. *H. micranthus*, Cav. Diss. iii. p. 155, t. 66. f. 1. *H. intermedius*, Hochst. in Schimp. Pl. Abyss. n. 2211. *H. parvifolius*, Hochst. in *l. c.* n. 2275.

Hab. Aden, prope sepulchretum veterum (*T. Anders.*).

Distr. In Arabia Petræa! Muscat! India! Ceylania! Abyssinia! Mozambique! Senegambia!

2. Abutilon, *Tourn.*

1. A. denticulatum (*Planch. in Herb. Hook.*). Caule tomentoso; foliis ovatis, cordatis, acutis, denticulatis, glauco-tomentosis, petiolatis; pedicellis petiolo longioribus; calycis segmentis acutis; carpellis

8–10, truncatis, muticis, tomentosis, trispermis.—*Sida denticulata*, Fresen. Mus. Sencken. i. p. 82.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! Scinde! Ægypto superiore! Senaar!

Ordo VII. STERCULIACEÆ.

1. Sterculia, *Linn.*

1. S. Arabica (*T. Anders.*). Glabra, cortice cinereo; foliis petiolatis, rotundatis, late ovatis obtusis, vel subrhomboideis acutis, basi interdum subcordatis, integris vel crenatis, utrinque glaberrimis, stipulis subulatis; racemis in ultimis ramis vel axillaribus, simplicibus, paucifloris, folio multo brevioribus; pedunculis glabris; pedicellis apice pilosulis; bracteis minutis, subulatis; calyce ad medium 5-fido, utrinque piloso, laciniis patentibus; floribus masculinis tubo stamineo exserto, 10-lobato, glabro; folliculis 4, anguste ovatis, acutis, pubescentibus.—*S. Abyssinica*, R. Br. partim in Append. Salt. Abyss. et in Pl. Javan. Rar. p. 227.

Hab. Aden (*Hook. fil. et T.*!).

Arbuscula 8–10-pedalis, glaberrima, foliata; *ramuli* abbreviati, paulo incrassati; *ramuli floriferi* in nodis foliosis abbreviatis aut in longitudine petiolum æquantibus, stipulis deciduis obtecti. *Folia* 3–5-nervia, 1–1½ unc. longa, 1–2½ unc. lata; *nervi* viridescentes; petiolus teres, glaber, ¼–¾ unc. longus. *Racemi* ½–1 unc. longi, graciles. Flores parvi. *Folliculi* teretes, subrostrati, fulvo-pubescentes, ¾ unc. longi, ½ unc. lati.

Tab. II. A. *Sterculia Arabica* (T. Anders.): fig. 1, male flower; 2, same laid open; 3, anthers; 4, fruit, natural size. (Figures 1, 2, and 3 are magnified.) B. Leaf and fruit of *S. Abyssinica,* R. Br., natural size.

I have examined, on two distinct occasions, the original specimens of *S. Abyssinica*, R. Br., in Salt's Abyssinian plants in the British Museum, and at the same time compared them with ten or twelve specimens of the Aden species *S. Arabica.* I find that among Salt's specimens of *S. Abyssinica* there is a fragment of *S. Arabica*, consisting of a portion of a branch with three leaves, and a fruit of four follicles on a very short axillary peduncle; and from this the description in the 'Plantæ Javanicæ Rariores,' of the fruit and partly of the leaves, of *S. Abyssinica* was deduced. Though Salt's specimens of these two species of *Sterculia* are said to be from Abyssinia, they are possibly from quite distinct localities; for that traveller, after touching at several points on the east coast of Africa, visited Aden and Arabia Felix. Whenever a favourable opportunity occurred, he seems to have collected plants, but (judging from his herbarium in the British Museum) without appending any notes or records of stations to his specimens. It is probable that the specimens of *S. Abyssinica* were obtained at Mozambique, where

Salt spent several days; and the fragment of *S. Arabica* mixed with the former species is most likely from Aden.

Had R. Brown seen flowering specimens of *S. Arabica,* he would doubtless at once have distinguished the two species, and, moreover, would have united his *S. Abyssinica* with his other species *S. Triphaca,* described from an imperfect specimen in fruit in the Paris Herbarium, collected by Loureiro at Mozambique, and which seems to have been considered distinct by Brown, on account of the fruit differing from what he mistook for the fruit of *S. Abyssinica,* but which I have above shown to be the fruit of *S. Arabica.*

Figure B. of Plate II. is taken from a *Sterculia* in the Hookerian Herbarium, from near Mozambique, named *S. ipomeæfolia,* Gerke, a careful comparison of which with the original specimens of *S. Abyssinica,* R. Brown, convinces me that it is certainly the same as that species. *S. Arabica* is easily distinguished from *S. Abyssinica* by its short-petioled, rotund, rarely acute, and perfectly glabrous leaves, very short, axillary, simple, nearly glabrous racemes, and by the markedly different fruit, which is only half the size of that of *S. Abyssinica.*

The leaves, petioles, and peduncles of *S. Abyssinica,* besides possessing other and more important characters, are always more or less tomentose.

Ordo VIII. TILIACEÆ.

1. Corchorus, *Linn.*

1. C. Antichorus (*Roemschal, Nomencl. Bot.,* ed. 3, p. 158). Caulibus prostratis diffusis; foliis petiolatis, subrotundis, ellipticis, plicato-crenatis, serratis; floribus axillaribus, binis; capsulis siliquæformibus, lanceolatis, deflexis, quadrivalvis, glabris.—*Antichorus depressus,* Linn. Mant. p. 64. *Jussiæa edulis,* Forsk. Descr. p. 210. *Corchorus fruticulosus,* Vis. Pl. Ægypt. et Nubia, p. 21, t. 3. p. 2. *Corchorus humilis,* Munro in Hort. Agrensi.

Hab. Aden (*Hook. fil. et T.! Madden! T. Anders.*).

Distr. In Arabia Felici! Muscat! Scinde! India boreali-occid.! atque ad Madras! Africa boreali! insulis Capitis Viridis.

2. Grewia, *Juss.*

1. G. populifolia (*Vahl, Symb.* i. p. 33). Caule fruticoso, virgato, ramulis pilis stellatis sparse vestitis; foliis alternis, brevi-petiolatis, orbiculatis, dentato-crenatis, 3–5-venosis, glaberrimis, junioribus subtus pilis stellatis pubescentibus; pedunculis solitariis pubescentibus, unifloris, rarissime bifloris, folio brevioribus, bracteolis duabus oppositis; sepalis lineari-lanceolatis, extus pubescentibus, corolla longioribus; petalis linearibus, breviter bifidis; stylo staminibus longiore; stigmate 4-lobato; drupis 2–4-lobatis, pyrenis globosis glabris vel pilis sim-

plicibus puberulis.—*G. betulæfolia,* Roth, Nov. Spec. p. 249. *Chadra tenax,* Forsk. Fl. Arab. n. 338.

Hab. Aden, rarissime (*Hook fil. et T*!).

Distr. In Arabia Petræa! Persia! Scinde! India boreali-occid.! pen. Ind. orient! Senaar! Senegal!

Frutex plerumque glaber. *Cortex* pallidus, subnitidus, partibus puberulis, pilis stellatis sparse obtectis. *Folia* $1\frac{1}{2}$–1 unc. longa, 4 lin.–1 unc. lata. *Pedunculus* 6–10 lin. longus. *Sepala* 6 lin. longa. *Drupæ* cortex flavus, nitidus.

Ordo IX. GERANIACEÆ.

1. Erodium, *L'Hérit.*

1. E. malapoides (*Willd. Sp.* iii. p. 640). Caulescens vel subacaule; foliis radicalibus ovatis, integris vel trilobatis, obtuse dentatis, basi cordatis, longe petiolatis, incano-tomentosis; pedunculis 2–3-floris; sepalis lanceolatis, acutis, 3-nerviis, dense pilosis; staminibus 5; stigmatibus 5; carpellis aristis barbatis.—*E. Arabicum,* Decaisne, Ann. Sc. Nat. ser. 2. vol. iii. p. 285. *E. bryoniæfolium,* Boiss. Diag. Pl. Orient. i. p. 61.

Hab. Aden, in arenosis maritimis (*Madden*!).

Distr. In Arabia Petræa! ad flumen Euphratem! in Persia! Beloochistan! Affghanistan! Punjab! Ægypto!

Herba perennis? depressa, incano-tomentosa. *Corolla* purpurea.

Ordo X. ZYGOPHYLLACEÆ.

1. Fagonia, *Tourn.*

1. F. cretica (*Linn. Sp.* p. 386; var. subinermis, *T. Anders.*). Caulibus erectis, patulis vel divaricatis ramosis; foliis paucis, simplicibus, rarissime trifoliolatis, ellipticis vel linearibus, obtusis vel acutis, mucronulatis, carnosis, subsessilibus; stipulis variabilibus, plerumque parvis inconspicuis seu longis gracilibus, acute spinescentibus; pedunculo tenui, deflexo, unifloro; capsula acuminata, subglabra.—*F. Hispanica,* Linn. Sp. p. 386; *F. Arabica,* Linn. *l. c.*; *F. glutinosa,* Delil. Fl. Æg. p. 86, t. 28; *F. mollis,* Delil. *l. c.* p. 76, t. 27. f. 2; *F. latifolia,* Delil. *l. c.* p. 86, t. 28. f. 3; *F. cistoides,* Delil. in herb. Bové, n. 169; *F. Mysorensis,* Roth, N. Sp. p. 215; *F. Oliveri,* DC. Prod. i. p. 704; *F. Persica* DC. *l. c.*; *F. Bruguieri,* DC. *l. c.*; *F. acerosa,* Boiss. Diag. Pl. Or. viii. p. 124; *F. Aucheri,* Boiss. *l. c.* i. p. 62; *F. echinella,* Boiss. *l. c.* viii. p. 123; *F. grandiflora,* Boiss. *l. c.* p. 121; *F. Kahirana,* Boiss. *l. c.* p. 122; *F. myriacantha,* Boiss. *l. c.* p. 123; *F. parviflora,* Boiss. *l. c.* p. 124; *F. Sinaica,* Boiss. *l. c.* i. p. 61; *F. subinermis,* Boiss. *l. c.* p. 62; *F. Thebaica,* Boiss. *l. c.* viii. p. 121; *F. Californica,* Benth. Bot. Sulph. Voy. p. 10; *F. Chilensis,* Hook. et Arn. in Bot.

Misc. iii. p. 165; *F. virens,* Coss in Kralik. Pl. Alger.; *F. fruticans,* Coss, *l. c.*; *F. diversifolia,* Boiss. in Pl. Or. nov. ser. vol. ii. p. 113.

Hab. Aden, in locis arenosis convallium (*Edgew., Hook. fil. et T.*! *T. Anders.*).

Distr. In Europa Mediterraneana! Africa ab Algeria usque ad caput Bonæ Spei! Asia tropica et calidiore tota! Chili! California!

I have devoted several days on two occasions to the examination of a most extensive suite of authentic specimens of the many described species of this genus, and both times I arrived at the same conclusion—that there is but one species. The Kew Herbarium contains about 400 specimens of *Fagonia*; and these I attempted to divide into De Candolle's two sections, of leaves simple and leaves trifoliolate. The result of this first apportioning was, that the one-leaved section contained only ten specimens, while 390 remained in the section with trifoliolate leaves. The ten simple-leaved specimens belonged to the following species: 2 of *F. cretica,* Linn.; 1 of *F. Oliveri,* DC.; 2 of *F. myriacantha,* Boiss.; 1 of *F. parviflora,* Boiss., and 4 of *F. subinermis,* Boiss. The remaining 390 specimens, all of which were more or less trifoliolate, included all the described species of *Fagonia.* The next step was the selection from the 390 specimens of all the individuals in which trifoliolate leaves alone occurred. These amounted to 123 specimens, leaving 267 as intermediate with the simple-leaved and trifoliolate sections. These 123 specimens, in which every leaf was trifoliolate, comprised the following species entirely:—*F. latifolia,* Delil.; *F. mollis,* Delil.; *F. cistoides,* Delil.; *F. glutinosa,* Delil.; *F. Kahriana,* Boiss.; *F. grandiflora*; Boiss.; *F. virens,* Coss; *F. Chilensis,* Hook. et Arn.; *F. Californica,* Benth., and in part *F. cretica,* Linn.; *F. Arabica,* Linn., and *F. Sinaica,* Boiss. Only one specimen, however, of *F. Arabica,* Linn., and a few of *F. cretica,* Linn., had wholly trifoliolate leaves. The remaining section, of 267 specimens having both simple and compound leaves, consisted almost entirely of *F. cretica,* Linn.; and of *F. Arabica,* Linn., with *F. Sinaica,* Boiss., and *F. parviflora,* Boiss., with the exception of one specimen of each, and included the whole of *F. Bruguieri,* DC., *F. Thebaica,* Boiss., and *F. echinella,* Boiss., *F. diversifolia,* Boiss., *F. fruticans,* Coss, and *F. Mysorensis,* Roth. The form and size of the leaves and stipules are also most variable; in some specimens the leaves are nearly absent, and their place is supplied by the long and hard spiny stipules; in others, such as *F. subinermis,* Boiss., and in the plant from Aden, the leaves are for the most part simple with inconspicuous stipules, but in some states of this variety, as well as the other so-called species, the leaves are nearly elliptical, and the spines exceed the leaves in length. The shape and relation of the parts of the flower and fruit vary but little, though in a few cases there is some variation, of the extremes of which, Boissier has constituted two species under the names *F. grandiflora* and *F. parviflora.* There is also great difference in the amount of general pubescence; it varies from nearly perfect smoothness to viscosity, as in the states *F. glutinosa,* Delil., and *F. mollis,* Delil., and some specimens of *F. latifolia,* Delil. The species

from North and South America, described as *F. Chilensis* and *F. Californica*, do not differ in any respect from many states of *F. cretica*, to which I unite them. In *F. Californica* the spiny stipules are very short, and the sepals somewhat more lanceolate and a little longer than in the mass of specimens of *F. cretica*; but there is in the Hookerian Herbarium a specimen from Arabia Petræa which it is quite impossible to distinguish from the Californian specimens. Dr. Hooker has also been unable to find permanent characters by which to distinguish any of the described species from *F. cretica*, and he agrees with me in considering all as varieties of one variable species.

2. Zygophyllum, *Linn.*

1. Z. simplex (*Linn. Mant.* p. 68). Caule prostrato, dichotomo, diffuso; foliis sessilibus, simplicibus, cylindricis, carnosis, obtusis; floribus parvis, solitariis, pedunculis brevissimis, in fructu deflexis; sepalis obovatis, apice cucullatis; petalis spathulatis, patentibus; capsulis oblongis, subrotundis, 5-angulis, rugosis, loculis 2–5-spermis.—*Z. portulacoides*, Forsk. Descr. p. 88.

Hab. Aden, ubique in arenosis (*Edgew., Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Arabia Petræa! et Felici! Scinde! Ægypto! Africa occid.! insulis Capitis Viridis!

Subherbaceum, perenne? viride, carnosum. *Caulis* rubescens. *Flores* parvi, numerosi, flavi.

Subclassis II. **Calycifloræ.**

Ordo XI. RHAMNEÆ.

1. Zizyphus, *Tourn.*

1. Z. Lotus (*Lam. Dict.* iii. p. 318). Ramulis spinosis, gracilibus; foliis ovatis, trinerviis, obsolete crenatis, subtus molliter tomentellis, aculeis binis, breviore recurvo, altero recto, petiolo longiore; floribus geminis, axillaribus; pedunculo petiolo multo breviore, deflexo; stylis duobus; ovariis bilocularibus; drupis subglobosis.

Hab. Aden (*Hook. fil. et T.*!)

Distr. In Arabia Petræa! Affghanistan! Algeria! Hispania!

Arbuscula. *Cortex* albidus. *Folia* 6 lin.–1½ unc. longa, 4 lin.–1 in. lata; petiolus 6 lin. longus. *Flores* inconspicui. *Drupa* solitaria, magnitudinis cerasi.

Ordo XII. TEREBINTHACEÆ.

1. Balsamodendron, *Kunth.*

1. B. Opabalsamum (*Kunth, Gen. Terebinth.* p. 16; var. glabra, *Hook. fil. in Herb. Hook.*). Glabrum, foliis bi- trijugis, rarissime simplicibus,

integris; foliolis lateralibus ovatis, terminali obovato; calyce persistente, campanulato, 4-dentato; petalis obovatis; staminibus 8, æquilongis; stylo antheris breviore; stigmate tetragono, obtuso. Fructu ovato, acuto, glabro, in sicco tetragono, biloculari, monospermo.

Amyris Opabalsamum, Forsk. Descr. p. 79. *B. pubescens*, Stocks in Bombay Trans. 1847, et Journ. of Bot. i. p. 264.

Hab. Aden, in monte Jibeel Shumshum, ad alt. 1500 ped. (*Hook. fil.*!).

Distr. In Arabia Felici! Beloochistan!

Arbor mediocris, 15-pedalis, inermis, balsamifera. *Truncus* basi incrassatus. *Rami* divaricati, cortice cinereo, lævi, tenui. *Flores* monoici, in apice ramulorum brevissimorum aggregati, subsessiles vel breviter pedunculati. *Corolla* rubra. Lignum, cortex, fructusque odorem balsamineum emittentes.

Dr. Stocks, in the 'Bombay Transactions' for 1847, says that this tree produces a gum of no value, and that the resin of commerce is yielded by *Balsamodendron Mukul*, Hook.

Ordo XIII. MORINGEÆ.

1. Moringa, *Juss.*

1. M. aptera (*Gärtn. Fruct.* ii. p. 315). Ramis divaricatis, nudis; foliis ad raches reductis; rachibus bi- tripinnatis, 4–8-jugis, deflexis; foliolis ovatis, obtusis, integris; paniculis erectis, axillaribus; floribus herbaceis, glaucis, pedicellatis; pedicellis bracteolatis, articulatis; calyce 5-partito, segmentis imbricatis, subæqualibus, oblongis; petalis oblongo-linearibus, reflexis; staminibus 10, inæqualibus; antheris unilocularibus; ovario libro, stipitato, 3-sulcato; fructu leguminiformi, longe rostrato, ad apicem inter semina valde constricto; leguminibus obscure trigonis, 3-valvis, valvis extus longitudinaliter bisulcatis, 3-fastigiatis; seminibus turbinatis, trigonis, pendulis; testa crustacea. *M. Zeylanica*, Linn. Sp. Plant. p. 546, et Delil. *Hyperanthera*, Forsk. Desc. p. 67. *Balanus myrepsica*, Belon, Obs. p. 126.

Hab. Aden, spontanea in vallibus saxosis prope locum "Steamer Point" dictum (*T. Anders.*).

Distr. In Arabia Petræa! Syria! Muscat! Ægypto superiore!

Arbor Arabica, 10–12-pedalis. *Cortex* cinereo-fuscus. *Ramuli* juniores virides. *Raches* sæpissime foliola gerentes, pedales. *Corolla* pallide flava. *Fructus* 8 unc.–1 ped. longus, deflexus. *Semina* oleaginea.

The seeds of this tree are said by Decaisne to yield the Ben oil of commerce; and he quotes the old traveller Belon as his authority. Guibourt also says that the true Ben oil is derived from *M. aptera*, Gärtn.; and De Candolle, who, however, doubts the distinctness of the species from *M. pterygosperma*, is of the same opinion. Lindley and Simmonds, and more recently Major Drury in India, agree in considering *M. pterygosperma* as the source from which the oil is obtained. Guibourt also mentions

an oil procured from this species. In the Museum of Economic Botany at Kew, there are specimens of an oil from the West Indies, Honduras, and also from Madras, extracted from the seeds of *M. pterygosperma*, and in every respect identical with the true Ben oil. In India the natives use this bland inodorous oil for retaining the perfume of delicate flowers, such as jasmine. It seems that both species therefore yield an oil similar in every respect, but that Ben oil was originally obtained from *M. aptera*. This is the more probable from "Ben," or "Ban," the Arabic name for the oil, being coextensive in use with the geographical distribution of the Aden species. In India the oil of *M. pterygosperma* is called "Soujhna," the word "Ben" being there unknown. Linnæus seems to have considered the two as varieties of one species, as in the 3rd edition of the 'Species Plantarum,' p. 546, under *M. Zeylanica*, he remarks, "Semina ex Asia tribus membranis longitudinaliter alata fuere; ex Africa vero membranis caruere."

Ordo XIV. LEGUMINOSÆ.

Subordo PAPILIONACEÆ.

1. ARGYROLOBIUM, *Eck. et Zey.*

A. ARABICUM (*Jaub. et Spach, Ill. Pl. Or.* i. p. 115). Ramis diffusis, gracilibus, teretibus, pilis adpressibus sericeo-pilosis; foliis trifoliolatis; foliolis plerumque linearibus, sæpe ovatis, margine revolutis; floribus pedunculatis, petiolis brevioribus, bifloris; calyce adpresse sericeo, segmentis lanceolatis, oblongis, acutis; corollæ vexillo subrotundo, emarginato, alis cultriformibus, obtusis; leguminibus linearibus, strigosis, undulatis, rostratis, stylo persistente acuminatis; seminibus 6–10, lenticularibus.—*Cytisus Arabicus*, Dcne. Ann. Sc. Nat., ser. 2. vol. iv. p. 78.

Hab. Aden, rarissime (*Hook. fil. et T*!).

Distr. In insula Neymen in Mare Rubro!

Suffrutex diffusus, ramosus, sericeo-pilosus. *Foliola* 2–6 lin. longa, plerumque angusta, linearia; petiolus 4–6 lin. longus. *Pedunculi* axillares, bracteolati. *Bracteolæ* parvæ, lanceolatæ. *Corolla* flava, glabra, calyce longior, 3 lin. longa. *Stamina* 10, monadelpha. *Stylus* filiformis, persistens, glaber. *Legumen* 1½ unc. longum, 1 lin. latum, basi calyce persistente vestitum.

Judging from the description only, *A. Bottæ*, Jaub. et Spach, from Jeddah, is probably the same as this species.

2. INDIGOFERA, *Linn.*

1. ARABICA (*Jaub. et Spach, Ill. Pl. Or.* v. t. 479). Argentea, sericea, ramulis diffusis; foliis 3–5-jugis vel trifoliolatis; foliolis oblongis, obovatis, mucronulatis, oppositis, stipulis subulatis, minimis; racemis axillaribus, multifloris, foliis brevioribus; calycibus profunde 5-fidis, seg-

mentis subulatis, setaceis; vexillo oblique obovato, breviter unguiculato, dorso sericeo, intus glabro, carina oblonga, biunguiculata; leguminibus planis, oblongis, cuspidato-acuminatis, valvis carinatis.

Hab. Aden, in saxosis (*Hook. fil.*!).

Distr. In Yemen, provincia Arabiæ Felicis! ad 'Wade Katte" in Arabia Petræa!

Suffruticulus decumbens, 2–5-pollicaris, omnino sericeus. *Folia* petiolata; petiolus 3 lin. longus. *Foliola* 1–2 lin. longa. *Racemi* breviter pedunculati. *Flores* conferti, fructu deflexi. *Corolla* coccinea. *Capsula*-2–5-sperma. *Semina* lævia, nitida.

This plant is described by Jaub. and Spach as being sometimes one foot long; the specimens I have seen are all small and stunted, ranging from two to five inches in length.

3. Pogonostigma, *Boiss.*

P. Arabicum (*Boiss. Diag. Pl. Or.* ii. p. 39). Ramis adscendentibus; foliis petiolatis, stipulatis, plerumque bijugis, foliolis oppositis, lineari-oblongis vel lanceolatis, mucronatis, supra molliter pubescentibus, subtus sericeo-tomentosis, racemis elongatis; calycis segmentis subulatis, acutis; leguminibus suborbicularibus, acutis, stylo persistente longe apiculatis, monospermis.—*Psoralea Arabica,* Hochst. in Schimp. Pl. Arab. n. 775. *Catacline sericea,* Edgew. in Journ. Asiat. Soc. Bengal. vol. xvi. p. 1214.

Hab. Aden (*Edgew., Madden*! *Hook. fil. et T.*! *T. Anders.*).

Suffrutex 1–2-pedalis, sericeo-tomentosus. *Folia* ½–1½ unc. longa; foliola 2–6 lin. longa, terminale geminum, fere duplo longius. *Racemi* subaphylli. *Flores* solitarii vel gemini; pedicellus 1–2 lin. longus. *Calyx* sericeus. *Corolla* calyce longior; vexillum extus sericeo-hirsutum, purpureum. *Semen* olivaceum, 1½ lin. longum.

4. Tephrosia, *Pers.*

T. Apollinea (*DC. Prod.* ii. p. 254). Suffruticosa, diffusa, amulis suberectis; foliis petiolatis, 3–4-jugis; foliolis oblongo-lanceolatis, cuneato-oblongis; floribus racemosis vel 3–4 axillaribus, pedunculis brevibus; calyce campanulato, dentibus subulatis; corolla calyce longiore; leguminibus patulis, linearibus, rostratis, planis, pubescentibus, 5–12-spermis.—*Galega Apollinea,* Delil. Fl. Æg. p. 144, t. 53. f. 5.

Hab. Aden, in rupibus (*Hook. fil.*!).

Distr. In Arabia Felici et Petræa! Scinde! Abyssinia! Ægypto superiore!

Suffrutex incano-tomentosus, stipulis subherbaceis, acute subulatis. *Folia* 1–2 unc. longa; foliola ½–1½ unc. longa, 1½–4 lin. lata, petiolo longiora. *Corollæ* vexillum extus sericeum, purpureum. *Legumen* 1½–3 unc. longum, 2–3 lin. latum.

5. Taverniera, *DC.*

1. T. glauca (*Edgew. in Journ. Asiat. Soc. Bengal*, xvi. p. 1214). "Glaberrima; foliis unifoliatis, carnosis, glabris, glaucis, rhomboideo-ovatis, suborbiculatis, emucronatis; stipulis 2, parvis, scariosis, cuneatis, acutis; racemis 5–10-floris; bracteis pedicello brevioribus, acutis, margine membranaceis; staminibus apice geniculatis, alternis brevioribus, decimo recto, multo breviore, geniculum vix attingente; legumine 2-articulato, setis introrsum arcuatis hispido."

"Next to *T. lappacea*, DC. ii. p. 339. Differs in smoothness, and the setæ of the legume are scarcely hamose; the stamens are more geniculate than is allowed to the generic character as given by DC. The pods are concealed by the withered, scarious, persistent petals."

"*Vexilla* magna, concava, per anthesin reflexa, subcarinata, breviter emarginata et calloso-mucronulata. *Alæ* angustæ, falcatæ, ellipticæ, basi truncato-auriculatæ, ungue brevi tenui vexillo plus duplo breviore. *Carina* vexillo major, obtusa. *Stylus* longus, basi tortuoso-geniculatus, filiformis, stigmate punctiformi apicali." No one has seen a *Taverniera* at Aden, except Mr. Edgeworth; and I know nothing of his plant, except from the description which I have quoted. If not identical with *T. glabra*, Boiss. (Diag. ii. p. 90), it is probably closely allied to it.

6. Rhynchosia, *Lour.*

1. R. pulverulenta (*Stocks in Kew Journ. of Bot.* iv. p. 147). Molliter subincana; ramulis teretibus; foliis trifoliatis, petiolatis; foliolis super velutinis, subtus reticulato-venosis, lateralibus oblique subrotundis, obtusis, subsessilibus, terminalibus rhomboideis, petiolatis; floribus axillaribus, racemosis vel subsolitariis; racemis abbreviatis, 3–7-floris; bracteis pedicello paulo brevioribus; calycis segmentis subulatis, acutis, inferiore cæteris longiore; leguminibus deflexis, basi attenuatis, falcatis, tomentosis, dispermis; seminibus ovatis, lævibus.

Hab. Aden, in vallibus arenosis prope littus (*Hook. fil. et T.* ! *T. Anders.*).

Distr. In Scinde!

Suffruticulus perennis. *Caulis*, in exemplis Arabicis, subprostratus seu volubilis. *Vexillum* extus subpubescens, flavum, 2 lin. longum. *Legumen* 6–8 lin. longum, 2 lin. latum. *Semina* fulva, punctis nigris notata.

This species is nearly allied to *R. Memnonia*, DC., but differs from it in the inflorescence, the length of the teeth of the calyx, and the colour and markings of the seed. In *R. Memnonia* the pubescence is more silvery-white, the leaves are more distinctly veined, and the pods are darker-coloured and broader than in *R. pulverulenta*.

Subordo Cæsalpineæ.

7. Cassia, *Linn.*

1. C. pubescens (*R. Br. in Salt, Abyss. App.*). Caule adscendente, obscure striato; foliis 6–9-jugis; foliolis oppositis, ovatis vel ovato-

oblongis, apice obtusis, rotundatis, emucronatis seu mucronulatis; petiolis eglandulosis; racemis axillaribus, multifloris, folio brevioribus; floribus breviter pedicellatis, bracteatis; bracteis subulatis, caducissimis; ovariis pubescentibus; stylis glabris; leguminibus oblongis, subreniformibus, utrinque rotundatis, falcatis, dense velutinis, 2–8-spermis; seminibus cuneiformibus, obtuse bilobatis, caudatis.—*C. Schimperi*, Steudel, Nomencl. Bot., ed. 2, i. p. 307; *C. pubescens* et *C. tomentosa*, Ehrbg. et Hemp.; *C. cana*, Wender. Linnæa, xii. p. 19.

Hab. Aden, in locis saxosis et glareosis (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici in regione "Tehama" dicta! Scinde!

2. C. OBOVATA (*Coll. Mon.* p. 92). Caule erecto, striato; foliis 3–7-jugis, petiolis eglandulosis; foliolis oblique ovatis vel cuneato-oblongis, apice rotundatis obtusisve, plus minus mucronatis, glaucis; racemis axillaribus, plerisque folia superantibus, multifloris; floribus breviter pedicellatis, pedicellis apice incrassatis; sepalis subæqualibus; corolla calyce duplo majori; antheris longe linearibus; ovariis subglabris; stylis glabris; leguminibus subreniformibus, compressis, utrinque obtusis, ad medium tumido-cristatis, 6–9-spermis, valvis transversim venosis.—*C. Senna*, Lam. Ill. t. 332.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.! Abyssinia! Ægypto! Africa centrali! Senegambia! Jamaica! Texas!

Suffrutex, species præcedente robustior, glaucus, partibus novellis pruinoso-glandulosis. *Folia* 2–5 unc. longa; stipulæ lanceolatæ, acutæ, demum reflexæ, persistentes; foliola ½–1 unc. longa, 3–5 lin. lata. *Sepala* glabra, nigrescentia, 4 lin. longa. *Petala* ovato-oblonga, obtusa, lineis nigro-purpureis notata, 5 lin. longa. *Legumen* stylo revoluto persistente apiculatum, glaucum, pilis simplicibus sparsissime obtectum, 1–1¼ unc. longum, 6–7 lin. latum.

Subordo MIMOSEÆ.

8. ACACIA, *Neck.*

Ser. *Gummiferæ*, Benth

§ *Summibracteatæ*, Benth.

1. A. EDGEWORTHII (*T. Anders.*). Caule glauco, ramulis novellis sæpe puberulis; petiolis subtomentosis; spinis rectis, longis, albescentibus vel puberulis; pinnis 4-jugis; foliolis 6–10-jugis, linearibus, obtusis, minute pruinosis; pedunculis folio brevioribus; leguminibus linearibus, falciformibus, crassis, tomentosis, obscure striatis, 14-spermis.—*A. erioloba*, Edgew.? Journ. Asiat. Soc. Bengal, xvi. p. 1215, non Benth.

Hab. Aden, frequenter (*Edgew.*, *Hook fil. et T.*! *T. Anders.*).

Arbuscula ab *A. Farnesiana* foliis leguminibusque differens. *Legumen* 5 unc. longum, 4 lin. latum.

§ *Medibracteatæ.*

2. A. EBURNEA (*Willd. Spec.* iv. 1081). "Ramulis foliisque ferrugineo-villosulis; spinis rectis, nonnullis longis, eburneis; pinnis 2–4-jugis, parvis, glandula petiolari majuscula; foliolis 6–8-jugis, minimis, linearibus, obtusis, hirtellis; pedunculis axillaribus, medio bracteatis; legumine stipitato, anguste lineari, falcato, subplano, glaberrimo."

Hab. Aden (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Affghanistan! India orientali! Ceylania!

Folia spinis sæpius breviora; pinnæ vix 2 lin. longæ; foliola conferta, ½ lin. longa. *Legumen* 2–3 poll. longum, circa 2 lin. latum, glaucescens.

As all the specimens of this species from Aden are in leaf only, I have given Mr. Bentham's description in the 'London Journal of Botany,' vol. i. p. 501.

Ser. *Vulgares.*

§ *Dicanthæ.*

3. A. HAMULOSA (*Benth. in Lond. Journ. of Bot.* i. p. 509). Caule cinereo; ramulis rubescentibus; aculeis ternis, infrastipularibus rectis, infrapetiolari hamoso recurvo; petiolis aculeatis; pinnis 2–3-jugis, inferioribus suboppositis seu alternis; foliolis 3–6-jugis, oblique oblongis, obtusis, glabris; pedunculis axillaribus, demum folio longioribus; spicis laxis; legumine ovato, lineari, utrinque rotundato, mucronulato, indehiscente; valvis membranaceis, planis, glabris.

Hab. Aden, in vallibus (*Hook. fil. et T.*! *T. Anders.*).

Distr. Jeddah in Arabia Felici!

Frutex 8-pedalis, divaricatus, aculeis acutis horridus. *Aculei* veteres nigrescentes. *Folia* 1–1½ unc. longa. *Pedunculi* leguminiferi, 2½ unc. longi. *Legumen* 3½ unc. longum, 1½ unc. latum.

Ordo XV. CUCURBITACEÆ.

1. CUCUMIS, *Linn.*

1. C. PROPHETARUM (*Linn.* spec. 1436). Prostratus, albido-pruinosus, scaber; caulibus tetragonis, striatis, flagellatis; foliis plerisque 3–5 palmato-lobatis, rigidis, fragilibus; cirris simplicibus; floribus solitariis, axillaribus; peponibus ovoideis, muricatis.—*C. Arabicus*, Del. in Cat. Hort. Monsp.; *C. amarus*, Stocks in Herb. Hook.; *C. anguinus*, Forsk.? Descr. p. 168.

Hab. Aden, in locis arenosis (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Muscat! Scinde! Africa centrali! Ægypto!

Annuus? ramuli graciles, angulati, fragiles, albi, punctis scabris pruinosis reflexis. *Folia* polymorpha et magnitudine variabilia, ovata vel cordata, plerumque 3–5-lobata vel subintegra, subtus reticulato-venosa. *Peponis* pulpa amara.

2. Citrullus, *Neck.*

1. C. Colocynthis (*Arn. MSS. in Wight Icon.* t. 498). Caulibus longissime prostratis, angulatis, sulcatis, angulis tuberculis asperis scabris; cirris simplicibus, exaxillaribus; foliis multifido-dissectis, supra glabris, subtus tuberculis prominentibus hispidis, albidis; floribus femineis in ultimis flagellis, breviter pedunculatis, calyce hirsuto; peponibus globosis, glabris.—*Cucumis Colocynthis*, Linn.

Hab. Aden, secus littus (*T. Anders.*).

Distr. In Scinde! Punjab! Ceylania! Ægypto superiore! Algeria! Hispania! Senegambia! insulis Canariensibus! insulis Capitis Viridis!

Asper tuberculis hispidis; flagelli (ramuli) 1–4½ ped. longi, arenam adpressi. *Flores* conspicui, viridi-flavi. *Pepo* amarus.

Ordo XVI. PORTULACEÆ.

1. Trianthema, *Linn.*

1. T. crystallina (*Vahl, Symb.* i. p. 32). Prostrata, diffusa, papulosa; caule fruticoso, tereti; foliis oppositis, spathulatis, ovalibus; floribus axillaribus, congestis; staminibus quinque; stylo uno; capsulis dispermis, operculo cyathiformi.—*T. triquetra*, Rottl.; *Papularia crystallina*, Forsk. Descr. p. 69.

Hab. Aden (*T. Anders.*).

Distr. In Arabia Felici! India orientali tota!

2. Orygia, *Forsk.*

1. O. decumbens (*Forsk. Descr.* p. 103). Caule prostrato seu suberecto, tereti; foliis alternis, ovatis, acutis, petiolatis; petioli basi margine scariosa; racemis laxis, terminalibus, rarissime axillaribus; bracteis subulatis, scariosis, suboppositis; calyce 5-partito, persistente; petalis et staminibus plurimis; capsulis globosis, 5-valvis, polyspermis.—*Portulaca decumbens*, Vahl, Symb. i. p. 33. *Talinum decumbens*, Willd. Spec. ii. p. 864.

Hab. Aden, a littore ad altitudinem 1000 ped. in montem Jibeel Shumshum (*Edgew. Hook. fil.!*).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.!, Africa australi!

Fruticosa, decumbens. *Caulis* 3–10 unc. longus, glaber. *Folia* subfarinosa, 4 lin.–1 unc. longa, 2–6 lin. lata. *Sepala* acuta, marginibus scariosis. *Corolla* violacea.

Ordo XVII. UMBELLIFERÆ.

1. Ptychotis, *Koch.*

1. P. Arabica (*T. Anders.*). Puberula, caule erecto; foliis gracili-petiolatis, pinnatis vel bipinnatis; segmentis ternatis, profunde lobatis, lobis cuneatis, 3–4-fidis; radiis 5–8; involucris pentaphyllis, laciniis setaceis, subulatis, acutis; involucellis 3–5-phyllis; petalis minutis, squamæformibus, apice mucronatis, mucrone involuto; carpellis 5–7? costatis, costis glanduloso-hirsutis.

Hab. Aden, in cacumine montis Jibeel Shumshum (*Hook. fil.*!).

Herba pusilla, 2–4-uncialis. *Caulis* teres, pilis patentibus puberulus. *Folia* herbacea, subtomentosa seu glabra. *Flores* inconspicui, in siccis albi. *Fructus* maturus ignotus.

Ordo XVIII. RUBIACEÆ.

1. Oldenlandia, *Linn.*

1. O. Schimperi (*T. Anders.*). Caule adscendente vel subdecumbente, scabro-glanduloso; ramulis virgatis, sparse foliatis; foliis linearibus, acutis, margine revolutis, mucronatis, obscure glandulosis; stipulis membranaceis, setis 3, subulatis; cymis terminalibus; calycis segmentis brevibus; corollæ tubo longissimo, gracili; capsulis subglobosis, truncatis. — *Kohautia Schimperi*, Hochst. et Steud. in Pl. Schimp. n. 879; *Hedyotis* sp.?, Edgew. Journ. Soc. Asiat. Bengal. xvi. p. 1216.

Hab. Aden, in arenosis (*Edgew.*, *Madden*! *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! in regione Tehama Arabiæ Felicis! Muscat!

Perennis, 1–1½-pedalis, glabra seu scabrido-glandulosa. *Folia* 6–9 lin. longa, ½–1 lin. lata; *corollæ* tubus 5–6 lin. longus; limbus 3–4 lin. latus. *Corolla* fulva.

I agree with Mr. Bentham in following Asa Gray in uniting *Kohautia* with *Oldenlandia*, a genus distinguished from *Hedyotis* by the dehiscence; which is loculicidal in *Oldenlandia*, and septicidal in *Hedyotis*.

Ordo XIX. COMPOSITÆ.

Subordo Tubulifloræ.

1. Vernonia, *Schreb.*

1. V. atriplicifolia (*Jaub. et Spach, Ill. Pl. or.* t. 359). Suffruticosa, ramosa, pilis adpressis incana; foliis petiolatis, carnosis, infimis spathulatis, integerrimis, superioribus ovatis vel sublinearibus, cuneatis, rhomboideis, dentatis, rarissime bidentatis, subsessilibus; involucris

5–6-seriali-imbricatis, squamis omnibus inæqualibus, exterioribus subcoriaceis, acutis, subpuberulis; acheniis abbreviatis, truncatis, hirsutis; pappo biseriali, exteriore brevissimo, setis lanceolatis, interiore corollam æquante, setis albidis, aristatis.

Hab. Aden, a littore ad cacumen montis Jibeel Shumshum (*Edgew. Hook fil. et T.! T. Anders.*).

Distr. In Arabia Felici.

Suffrutex perennis. *Caulis* lignosus, 6-unc.–1-pedalis. *Involucrum* paulo variegatum, pallide violaceum. *Corolla* 1–2 lin. longa, violacea.

2. Varthemia, *DC.*

1. V. Arabica (*Boiss. Diag.* vi. p. 74). Suffruticosa, glanduloso-tomentosa, ramulis apice corymbosis; foliis lanceolatis, basi attenuatis, apice mucronulatis, integris, utrinque puberulis; pedunculis terminalibus, cymosis; involucri squamis lanceolatis, acutis, adpressis, exterioribus brevibus, subulatis; acheniis subhirsutis; pappo biseriali, setis externis brevissimis, rigidis, internis 15-barbatis.

Hab. Aden, prope mare (*Hook. fil.*).

Distr. In Muscat!

Species distincta. *Suffrutex* perennis, 8-unc.–1-pedalis, foliosus. *Folia* 1–1½ unc. longa, 1–2 lin. lata. *Corolla* flava. *Setæ* exteriores acheniis triplo breviores. *Achenium* ½ lin. longum.

De Candolle describes *Varthemia* as having the pappus uniserial; in five species that I have examined, in addition to the original species *V. Persica*, the pappus is in two rows, the outer consisting of short rigid setæ.

3. Iphiona, *DC.*

1. I. scabra (*DC. in Ann. Sc. Nat.* sér. 2. ii. p. 263). Glandulosa, scabra, caule ramosissimo folioso; foliis lineari-lanceolatis, subpungenti-acutis, sæpissime integris, interdum dentatis; floribus corymbosis; involucris imbricatis, lineari-lanceolatis, membranaceis, glabris; acheniis sericeo-hirsutissimis, striatis; pappo multiseriali; setis aristoideis, barbatis.

Hab. Aden, frequentissime (*Madden! Hook. fil. et T.! T. Anders.*).

Distr. In Arabia Petræa! Muscat!

Species in forma foliorum variabilis. *Folia* in plerisque rigida, spinescentia, in nonnullis herbacea.

4. Hochstetteria, *DC.*

1. H. Schimperi (*DC. Coll. Mem.* ix. t. 6). Caule erecto, striato, glabro, basi interdum gossypino- tomentoso; foliis ovatis, mucronatis, basi in petiolum attenuatis, obscure serratis, margine scabris; floribus 1–2 in terminalibus ramorum; involucris præmultis, lanceolatis, argute spinescentibus, apice serrato-barbatis, glabris, exterioribus demum re-

flexis; acheniis apice truncatis, basi attenuatis, hirsutissimis; pappo uniseriali, rigido.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! Scinde!

Herba annua? gossypino-tomentosa vel subglabra. *Caulis* striatus. *Folia* ½–1 unc. longa, 2–5 lin. lata; foliorum margo punctis asperis scabra. *Involucri* squamæ sub-3-costatæ. *Flores* aurantiaco-flavi.

Subordo Ligulifloræ.

5. Brachyramphus, *DC.*

1. B. lactucoides (*T. Anders.*). Glaber; caule adscendente, tereti, gracili; foliis radicalibus obovatis, runcinatis, obtusis, margine dentato-ciliatis; caulinibus amplexicaulibus, sagittatis, subtus glaucis; floribus paniculatis; paniculis laxis, multifloris, pedunculis gracilibus, filiformibus; bracteis minutis, scariosis; involucris imbricatis; squamis exterioribus parvis ovatis, margine scariosis, interioribus longe lineari-acuminatis; acheniis utrinque attenuatis, angulatis, tuberculatis, paulo adpressis; pappo pluriseriali, molliter piloso.—*Lactuca Massavensis*, C. H. Schultz in Schimp. Pl. Abyss. n. 1462.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa? Beloochistan! Abyssinia!

The shape of the achenia and the sessile white and downy pappus remove this plant from *Lactuca*, with which Schultes associates it. Though it much resembles some of the other species of *Brachyramphus*, it can at once be distinguished from them by its slender-pedunculated flowers and loose panicles.

Subclassis III. **Corolliforæ.**

Ordo XX. APOCYNEÆ.

1. Adenium, *Rœm. et Sch.*

1. A. obesum (*Rœm. et Sch. Systema*, ii. p. 411). Fruticosum, caudice ramisque crassis; foliis ad apicem ramorum confertis, ellipticis, ovatis vel spathulatis, subpetiolatis, obscure mucronatis, integris, crassiusculis, eveniis, glabris, subtus glaucis; pedicellis solitariis vel geminis, subaxillaribus terminalibusve, villosis; floribus folio longioribus; calycis segmentis lanceolatis, villosis; corolla extus puberula, intus pubescente; limbi lobis rotundatis, obtusis.—*Nerium obesum*, Forsk. Descr. p. 205; *Pachypodium obesum*, G. Don, Syst. Gard. iv. p. 80. *Cameraria obesa*, Spreng. Syst. i. p. 641. *Adenium Hongel*, Bot. Reg. xxxii. t. 54, non DC. Prod. viii. p. 412.

Hab. Aden, in rupibus (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici!

Frutex 1–3-pedalis, succo lacteo. *Caudex* globosus, crassus, carnosus.

ambitu 1–2 ped. *Rami* teretes, crassi, aphylli, dichotomi. *Folia* et *flores* in apice ramorum. *Corolla* purpurea, 1½–2 unc. long.; limbus 1 unc. latus.

Ordo XXI. ASCLEPIADACEÆ.

1. Steinheilia, *Decaisne.*

1. S. radians (*Dcne. in Ann. Sc. Nat.* sér. 2. ix. p. 339). Incana, villosa, caule erecto; foliis subreniformibus, acutis, serratis, pulcherrime variegatis, petiolatis; pedunculis axillaribus, solitariis, multifloris; floribus umbellatis, pedicellis brevibus; calycibus 5-partitis, segmentis lanceolatis, incano-hirsutis; corolla calyce duplo longiore, glabra, limbo 5-fido, lobis erectis, lanceolatis, acutis, contortis, tubo 5 foveis instructo; folliculo ovoideo, villoso.—*Asclepias radians,* Forsk. Descr. p. 49.

Hab. Aden, rarissime, in arenosis (*T. Anders.*).

Distr. In Arabia Felici!

Herba perennis, odore mellis. *Folia* lurido-viridia, subtus violacea, 1 unc. longa, 1½ unc. lata; petiolus ½ unc. longus. *Pedunculus* tomentosus, 1–2 unc. longus. *Corolla* 5 lin. longa, violacea. *Folliculus* abortu solitarius, carnosus.

2. Glossonema, *Decaisne.*

1. G. Boveanum (*Dcne. in Ann. Sc. Nat.* sér. 2. ix. p. 335). Incanum, "foliis lanceolatis vel ovato-lanceolatis, sinuato-dentatis, crispis, utrinque pubescenti-incanis; coronæ squamis apice emarginatis, medio subulatis; folliculis ovatis, attenuatis, spinis innocuis instructis."—*Gomphocarpus pauciflorus,* Hochst. et Steud. in Pl. Schimp. n. 920.

Hab. Aden (*Edgew.*).

Distr. In Arabia Felici!

Herba perennis, incana. *Folia* opposita, linearia, lanceolata. *Pedunculi* extra-axillares. *Pedicelli* basi bracteolis setaceis instructi.

I have not seen Edgeworth's specimen from Aden, and have therefore adopted Decaisne's description, from the 'Annales des Sciences Naturelles,' and De Candolle's 'Prodromus,' vol. viii. p. 554.

Ordo XXII. CONVOLVULACEÆ.

1. Convolvulus, *Linn.*

1. C. glomeratus (*Chois., DC. Prod.* ix. p. 401). Caulibus præmultis, prostratis, teretibus, gracilibus, pilis adpresssis pubescentibus; foliis hastato-lanceolatis, acutis, mucronulatis, petiolatis; glomerulis axillaribus; pedunculis folio duplo longioribus; bracteis foliaceis, lanceolatis, villosis, calycem paulo superantibus; sepalis ovato-lanceolatis, fusco-villosis; corolla calyce longiore, glabra; capsulis globosis; semi-

nibus glabris, lævibus.—"*Convolvulus capitatus*, Vahl" in Schimp. Pl. n. 731 et 784, sed non *C. capitatus*, Vahl.

Hab. Aden (*Edgew., Hook. fil. et T.*!).

Distr. Arabia Felici! Scinde! Abyssinia!

2. C. SERICOPHYLLUS (*T. Anders.*). Caule suberecto? ramulis strictis, sericeis, elongatis; foliis lanceolatis, acutis, basi in petiolum attenuatis, utrinque incano-sericeis; floribus axillaribus, breviter pedunculatis, solitariis, geminis ternisve; bracteis parvis, subulatis; sepalis ovatis, sericeo-pubescentibus, submembranaceis; corolla calyce duplo longiore, extus sericeo-hirsuta; capsula globosa, glabra.

Hab. Aden (*Hook. fil. et T.*!).

Suffrutex perennis, omnino incano-sericeus, 2-pedalis. *Caulis* et *ramuli* teretes, virgati. *Folia* 3 lin.–1 unc. longa, ½–2 lin. lata. *Pedunculus* 2 lin. longus. *Calyx* 1 lin. longus. *Corolla* 3 lin. longa.

Species *C. microphyllo* (Sieb.) proxima, sed calyce et corolla parvis sepalisque obtusis facile distinguenda.

2. CRESSA, *Linn.*

1. CRESSA LATIFOLIA (*T. Anders.*). Incano-tomentosa, pilis adpressis, caulibus et ramis subtortuosis, foliaceis; foliis ovatis, obtusis, integris, utrinque incano-tomentosis; floribus ad apicem ramulorum, axillaribus, solitariis, sessilibus; sepalis ovatis, acuminatis, tomentosis; corolla calyce vix longiore, extus hirsuta; staminibus inclusis; stylis paulo exsertis, ovariis hirsutis; capsula puberula; seminibus glabris. —*Seddera latifolia*, Hochst. et Steud. n. 884. *Breweria evolvuloides*, Chois. Convs. Or. p. 112. *Seddera evolvuloides*, Wight, Icon. t. 1369.

Hab. Aden, ad altitudinem 800 ped. in montem Jibeel Shumshum (*Hook. fil.*).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.! Abyssinia!

I can find no characters of sufficient importance to keep *Seddera* as a genus distinct from *Cressa*. The stamens, included in the dry specimens, are said not to be so in the living plant. Dr. Stocks, in a note on this species in the Hookerian herbarium, says that in the fresh plant the corolla is rolled back, so as to expose the stamens. Wight's figure (Icones, t. 1369) is merely a glabrous state of this species, which Choisy referred to *Breweria*.

Ordo XXIII. BORAGINEÆ.

1. HELIOTROPIUM, *Tourn.*

1. H. STRIGOSUM (*Willd. Sp.* i. p. 743). Fruticulosum, radice lignoso; caulibus erectis vel prostratis, ramosissimis, omnibus pilis adpressis strigosis, canescentibus; foliis ovatis-acutis vel linearibus, integris, margine revoluto, sessilibus; racemis terminalibus, laxis, elongatis, dissitifloris; floribus subsessilibus, solitariis; calycis segmentis ovatis, rotundatis, strigoso-pubescentibus; corolla extus pubescente, calyce

paulo longiore; nucibus rotundatis, hirsutis.—*Heliotropium brevifolium* et *H. tenue*, Wall. *H. tenuifolium*, R. Br. Prod. 494. *H. fruticosum*, Forsk. *H. parvifolium*, Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1216.

Hab. Aden, a littore usque ad cacumen montis Jibeel Shumshum (*Edgew., Hook. fil. et T.! T. Anders.*).

Distr. In regionibus tropicis orbis veteris, a Senegambia ad Siam, etiamque in regione tropica Australiæ.

Ordo XXIV. SOLANACEÆ.

1. Lycium, *Linn.*

1. L. Europæum (*Linn. Syst.* ii. p. 28, *et T. Anders. in Annal. Nat. Hist.*, ser. 2, xx. p. 126). Fruticosum, cortice albido vel purpureo; ramis spinescentibus, spinis teretibus; foliis 2–5, ad basin spinarum fasciculatis, obovato-oblongis vel oblongo-cuneatis; pedicellis e fasciculis foliorum interdum geminis, plerumque solitariis, unifloris, calyce longioribus; calyce breviter 5-dentato, glabro vel puberulo; corolla calyce duplo vel triplo longiore, anguste infundibuliformi, staminibus inclusis.—*L. salicifolium*, Mill. Dict. n. 3. *L. indicum*, Wight, Icon. t. 1403. *L. Mediterraneum*, Dun. in DC. Prod. xiii. p. 523. *L. Edgeworthii*, Dun. *l. c.* p. 525. *L. orientale*, Miers, *Ill. S. Amer. Pl.* p. 99. *L. Persicum*, Miers, *l. c.* p. 100.

Hab. Aden, secus littus (*Hook fil. et T.! T. Anders.*).

Distr. In regione Mediterranea Europæ et Africæ! insulis Canariensibus! Arabia Felici! Scinde! Punjab! Pen. Ind. orient.!

Folia punctulata, ½–1 unc. longa. *Spinæ* axillares, nudæ, vel foliola ¼–1 unc. longa. *Calyx* 5-dentatus, campanulatus, 1½ lin. longus, glaber, punctatus. *Filamenta* inclusa, inæqualia, uno cæteris breviore. *Corolla* 4–6 lin. longa, cæruleo-purpurea. *Bacca* globosa, glabra.

Ordo XXV. SCROPHULARINEÆ.

1. Anarrhinum, *Desf.*

1. A. pedicellatum (*T. Anders.*). Glabrum, suffruticosum, ramis virgatis, foliis linearibus, plerumque integris, acutis, crassiusculis, inferioribus interdum bidentatis; racemis laxissimis, dissitifloris, virgatis; pedunculis foliis longioribus, solitariis, unifloris; calycis segmentis ovato-lanceolatis, acutis, glabris, margine subscarioso; corolla calyce duplo longiori, ecalcarata, glabra; capsulis magnis, nutantibus; seminibus ovoideis, tuberculatis.

Hab. Aden (*Edgew.? Hook. fil. et T.!*).

Suffrutex glaber, 6-unc.–1½-pedalis. *Rami* graciles, virgati. *Folia* integerrima, rarissime bidentata, linearia, glabra.—*A. pubescenti* (Fre-

sen.) accedit, sed ab eo differt glabritie, foliis omnibus linearibus, racemis dissitifloris, virgatis, pedicellis longioribus.

2. Anticharis, *Endl.*

1. A. Arabica (*Endl. Nov. Stirp. Decad.* p. 23). Erecta, glutinosa, foliis alternis, ovato- vel lineari-oblongis, obtusis, petiolatis, pubescenti-glutinosis; pedunculis axillaribus, unifloris, infra medium bibracteolatis; corolla tubulosa, fauce elongata, ampla; staminibus duobus, inclusis; capsulis ovatis, acuminatis, rostratis, bisulcis; seminibus numerosis, rugosis.—*Capraria Arabica,* Hochst. et Steud. Pl. Arab. un. iter, n. 748. *Meissarrhena tomentosa,* R. Br. in Salt, Abyss. app.

Hab. Aden (*Edgew. Hook. fil.* !).

Distr. In Arabia Felici! Scinde!

Herba annua, glutinosa, pubescens. *Caulis* teres, erectus, 4–9-unc. *Folia* 5 lin.–1 unc. longa, 1–3 lin. lata. *Pedunculus* 2–3 lin. longus. *Corolla* 4–5 lin. longa, glabra, venosa, cærulea. *Capsula* puberula, 2½–3 lin. longa.

3. Lindenbergia, *Lehm.*

1. L. Sinaica (*Benth. Scroph. Ind.* p. 22). Villosa, ramis erectis, divaricatis; foliis subrotundato-ovatis, petiolatis, grosse crenato-dentatis, floralibus subsessilibus; racemis elongatis, terminalibus, foliaceis; floribus oppositis, secundis; calyce campanulato; corolla calyce triplo longiore, labio superiore erecto, inferiore breviore; staminibus 4; capsula ovoidea, bisulca, pubescente.—*Bovea Sinaica,* Dcne. Ann. Sc. sér. 2. ii. p. 253.

Hab. Aden, in puteis veteribus (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! et Felici!

Herba viscosa, villosa. *Caulis* perennis. *Folia* 4 lin.–1 unc. longa, 2–7 lin. lata. *Racemi* semipedales ad pedales; flores remoti vel rarissime conferti. *Calyx* folia floralia superans. *Corolla* 5–7 lin. longa, flava.

4. Campylanthus, *Roth.*

1 C. junceus (*Edgew. in Journ. Asiat. Soc. Bengal,* xvi. p. 1217). Glaber, ramis elongatis, virgatis, subaphyllis; foliis linearibus, acutis, integerrimis, crassiusculis, caulinibus parvis subulatis; racemis elongatis, virgatis, terminalibus; floribus alternis, pedicellatis, secundis; pedicellis brevibus, basi bibracteatis, unifloris; calyce 5-partito, segmentis lanceolatis acutis; corolla calyce multo longiore, tubo elongato incurvo, limbo patente subæquali; staminibus duobus; antheris demum ad confluentia loculorum unilocularibus; seminibus numerosis, orbicularibus, compressis, marginatis.

Hab. Aden (*Edgew., Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Scinde?

Suffrutex glaber, subglaucus, 1–3-pedalis. *Folia* inferiora, 1–2½ unc.

longa, 1–2 lin. lata, breviter petiolata. *Racemi* 6, semipedales ad pedales. *Pedicelli* 1–2 lin. longi. *Bracteæ* minute ciliatæ. Corollæ *tubus* 3 lin. longus; limbus 3 lin. latus; lobi ovati. *Corolla* flavo-albida.

Ordo XXVI. ACANTHACEÆ.

1. Blepharis, *Juss.*

1. B. Edulis (*Pers. Synops.* ii. p. 180). Subacaulis, ramis nullis vel divaricatis, prostratis suberectisve, plerumque pubescenti-velutinis vel hirsutis; foliis ovato-linearibus, grosse spinoso-dentatis; tuberculis piliferis, utrinque scabris; spicis columnaribus vel abbreviatis, quadrifariis; bracteis ovato-lanceolatis, spinoso-acuminatis, 5–7-nerviis, margine dentatis, 5–7 spinis; bracteolis linearibus, lanceolatis; calycis sepalis membranaceis, tomentosis, inferiore trinervi integra, superiore binervi bidentata, lateralibus subulatis uninerviis; capsulis glabris, dispermis; seminibus pilis adpressis, fusco-incanis.—*Acanthus Delilii*, Sp. Syst. iii. p. 819. *Acanthus pectinatus*, Willd. n. 11727. *Acanthus edulis*, Vahl, Symb. i. p. 48, et Forsk. Descr. p. 114. *Acanthodium spicatum*, Del. Fl. Ægypt. p. 97, t. 33. f. 3. *Ruellia ciliaris*, Linn. Mant. p. 89. *Ruellia Persica*, Burm. Pl. Ind. p. 135. *Acanthodium sinuatum*? β. *nanum*, Nees, DC. Prod. xi. p. 274. *Acanthus imbricatus*, Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1217.

Hab. Aden, in convallibus glareosis (*Edgew.*, *Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Arabia Petræa! littoribus Sinus Persici! Scinde! Ægypto superiore! Nubia!

Fruticulus perennis, horridus, subacaulis, sæpe spica sola constitutus. *Spicæ* 2–6 unc. longæ. *Bracteæ* rigide pungentes, 1¼ unc. longæ. *Corolla* azureo-cærulea.

Ordo XXVII. VERBENACEÆ.

1. Bouchea, *Cham.*

1. B. marrubiifolia (*Schauer in DC. Prod.* xii. p. 558). Dichotoma, velutina, ramis teretibus; foliis ovatis petiolatis, serrato-dentatis, supra glabriusculis, subtus incano-velutinis, rugoso-reticulatis; spicis terminalibus, multifloris; bracteis lanceolato-subulatis, parvis; floribus alternis, sessilibus; calyce 5-angulato, plicato, 5-dentato; corolla calyce duplo longiore, hypocraterimorpha; staminibus 4, inclusis; capsulis calyce inclusis, dicoccis, coccis demum dissilientibus.—*Chascanum marrubiifolium*, Fenzl, in Kotschy, Pl. Nub. n. 32.

Hab. Aden, in locis depressis (*Hook. fil.*! *T. Anders.*).

Distr. In Scinde! Ægypto!

Ordo XXVIII. LABIATÆ.

1. Lavandula, *Linn.*

1. L. setifera (*T. Anders.*). Glabra, caulibus subaphyllis, subtetragonis, fere 6-costato-striatis; foliis pinnatis, segmentis linearibus, integris vel dentatis, crassiusculis; bracteis (foliis floralibus) alternis, unifloris, membranaceis, basi dilatatis, longe setaceis, calyce duplo longioribus; spicis terminalibus, simplicibus, densis; calyce 15-nervio, 5-dentato, velutino.

Hab. Aden (*Hook. fil. et T.*).

Subherbacea. Caules virgati, subnudi, glabri, semipedales. *Folia* pilis sparsissimis glabriuscula. *Spicæ* 1–1¼ unc. longæ, velutinæ. *Calyx* 2 lin. longus. Corollam non vidi.

Ordo XXIX. PLUMBAGINEÆ.

1. Statice, *Willd.*

1. S. axillaris (*Forsk. Descr.* p. 58). Fruticosa, glabra, caulibus divaricatis, foliosis; foliis oblongo- vel lanceolato-spathulatis, acutiusculis, carnosis, glaucis, in petiolum attenuatis; petiolo basi fusco, caulem vaginante; scapis axillaribus vel subterminalibus, paniculatis, paulo angulatis; floribus confertis; spicis breviusculis, secundis, spiculis 2–3-floris; bracteis persistentibus, coriaceis, fuscis, margine subalbido, superiore involuta enervi obtusa, inferioribus triplo majore; calyce infundibuliformi, basi hispido, persistente, 5-costato, limbo hyalino, lobis obtusis.—*S. Bovei*, Jaub. et Spach, Ill. Pl. Or. i. t. 86. *S. lanceolata*, Edgew. Journ. Asiat. Soc. Beng. xvi. p. 1218.

Hab. Aden. in littore, etiam in cacumine montis Jibeel Shumshum (*Edgew., Hook. fil. et T. Madden, T. Anders.*).

Distr. In littoribus Arabicis Maris Rubri!

Species distincta sed *S. Arabicæ* et *S. Stocksii* affinis, ab eis differt forma foliorum et petiolorum, paniculis, bracteis calycibusque.

Ordo XXX. SALVADORACEÆ.

1. Salvadora, *Linn.*

1. S. Persica (*Linn. Spec. Plant.* vol. i. p. 122). Adscendens, cortice glauco; foliis oppositis, petiolatis, ovatis, lineari-lanceolatis, acutis, mucronulatis, eveniis, subcarnosis, glaucis; stipulis inconspicuis; paniculis in ultimis ramorum, oppositis, folia superantibus, multifloris; floribus in ramulis paniculæ sessilibus; calyce 4-partito, segmentis ovatis, obtusis; corolla calyce paulo longiore, membranacea, profunde 4-fida; lobis ovatis, apice rotundatis, concavis; staminibus quatuor, corollæ lobis alternis; stylo abbreviato, incrassato; bacca globosa, gla-

bra, calyce corollaque persistentibus basi cincta.—*S. paniculata,* Zuccar. *S. crassinervia,* Hochst. in Schimp. Pl. Abyss. n. 2218.

Hab. Aden (*Edgew., Hook. fil. et T.! T. Anders.*).

Distr. In Arabia Petræa! Scinde! Abyssinia! Ægypto! Africa centrali!

Arbuscula divaricata, glauca, 2–6-pedalis. *Folia* coriacea, 1½–4 unc. longa, 5 lin.–1 unc. lata; petiolus 2–4 lin. longus. *Bacca* matura rubra! magnitudinis pisi parvi.

This plant is the original species on which Linnæus's genus was founded. Roxburgh in his 'Coromandel Plants,' p. 26, tab. 26, referred the common Indian species (*S. indica* of Wight's 'Icones') to *S. persica,* Linn., from which, however, it is quite distinct.

Salvadora Persica, L., is found in India only in Scinde, and perhaps in the Punjab. The *Salvadora Indica* and *Stocksii* of Wight (*L. Persica,* Roxb., non Linn.) is distinguished from *L. Persica,* Linn., by its distinctly pedicellated flowers, broader, always ovate leaves, and darker, scarcely glabrous appearance; it also grows to a much larger size. It is extensively distributed over India and Ceylon.

A third species (*Salvadora oleoides,* Decaisne, in Jacquemont, Voy. Botanique, p. 139, tab. 144), found only in the plains of North-Western India from Delhi to the Indus, is readily distinguished from the preceding species by its virgate elongated racemes with very short spikelets, and always narrow-linear-lanceolate, subsessile, thickly coriaceous leaves. This is evidently the *S. indica,* of Royle's Ill. p. 319, of which, however, there is no detailed description, and the *S. Persica* of Wight's 'Icones,' tab. 1621 A. It forms a spreading subglaucous bush, from three to six feet high. It is the "Puloo" of the inhabitants of the Punjab.

Subclassis IV. **Monochlamydeæ.**

Ordo XXXI. PHYTOLACCACEÆ.

1. Limeum, *Linn.*

Sect. *Limeastrum.*

1. L. Indicum (*Stocks, MSS. in herb. Hook.*). Caulibus diffusis, subprostratis, junioribus pubescentibus; foliis oppositis, petiolatis, ovalibus, rotundatis, acutis, mucronulatis, integris; petiolis basi scariosis, vaginantibus; cymis simplicibus axillaribus, confertis, bracteatis, foliis brevioribus, 4–10-floris; petalis unguiculatis, apice truncato-dentatis; calycis segmentis ovatis, acutis, margine scariosis; staminibus 6–7, petalis alternis; stylis binis; coccis duobus, glabris, monospermis.

Hab. Aden, in locis depressis prope mare (*Hook. fil.*!).

Distr. In Scinde! Nubia!

Herba glabra vel puberulo-viscidula. *Radix* perennis. *Caules* 4-unciales-1-pedales, teretes. *Folia* 2–5 lin. longa, 1–3 lin. lata; petiolus 1–2 lin. longus.

Ordo XXXII. SALSOLACEÆ.

1. Traganum, *Delile.*

1. T. nudatum (*Delil. Fl. Ægypt. Ill.* p. 57). Suffruticosum, ramulis alternis, tortuosis, teretibus, albis; foliis alternis, oblongo-triquetris vel teretibus, brevibus, incrassatis, basi dilatatis, mucronatis, glabris, glaucis; floribus solitariis vel 2–3 confertis; Calyce 5-fido, segmentis lanceolatis obtusis mucronatis, basi pilis floccosis apteris; staminibus 5, exsertis; filamentis compressis, deflexis; antheris sagittatis; stylis duobus; utriculo depresso, calyce indurato occulto.

Hab. Aden, secus littus (*T. Anders.*).

Distr. In Arabia Petræa! Ægypto! Algeria! insulis Canariensibus!

Suffrutex salsoloides. *Rami* divaricati, arenam marinam adpressi. *Folia* crassa, carnosa, brevia, sæpe late subulata, subpungenti-mucronata, succo aqueo plena.

Ordo XXXIII. AMARANTACEÆ.

1. Ærva, *Forsk.*

1. Æ. Javanica (*Juss. Anns. Mus.* xi. p. 131). Caule herbaceo, inferne suffruticoso, ramoso, erecto, tereti, albido-tomentoso; foliis alternis, subsessilibus vel petiolatis, ovatis, oblongo-lanceolatis vel obovatis, superne eveniis, subtus venosis, utrinque incano-tomentosis; paniculis terminalibus, aphyllis, adscendentibus, plerumque elongatis, interdum abbreviatis; spicis alternis, sessilibus, cylindricis, flexuosis, albo-lanatis; floribus densissime confertis; bracteis membranaceis, glabris, ovatis, acutis; sepalis 5, obovato-lanceolatis, obtusis, tenuibus, lanatis; floribus raro hermaphroditis vel staminiferis, plerumque pistilliferis; stigmatibus 2–3; utriculo subrotundo; calyce incluso, monospermo.—*Celosia lanata,* Linn. Spec. p. 298. *Iresine Javanica,* Burm. Fl. Ind. p. 212. *Illecebrum Javanicum,* Ait. Hort. Kew., ed. 1, i. p. 289. *Ærva tomentosa,* Forsk. Fl. Arabico-Yemen. n. 584, et Descr. p. 170. *Æ. Ægyptiaca,* Gmel. Syst. Nat. p. 1026. *Æ. incana,* Mart. in Nov. Acad. Nat. Cur. xii. p. 291. *Achyranthes alopecuroides,* Lam. Dict. i. p. 548. *A. Javanica,* Pers. Synops. i. p. 269. *A. incana,* Roxb. Fl. Ind., ed. 1832, i. p. 671.

Hab. Aden, locis depressis in convallibus, et in monte Jibeel Shumshum (*Hook. fil. et T.*! *Madden*!).

Distr. In toto orbe veteri calido ab insulis Capitis Viridis usque ad Javam.

Perennis, 1–2-ped., albido-tomentosa, tomento floccoso. *Folia* forma variabilia, 5 lin.–2 unc. longa, 2–8 lin. lata. *Petiolus* semiuncialis aut nullus. *Paniculæ* 3–8 unc. longæ, graciles vel congestæ. *Spicæ* conglomeratæ vel laxæ, 2 unc. longæ.

2. Saltia, *R. Br.*

S. papposa (*Moq. in DC. Prod.* xiii. pars 2. p. 325). Suffruticosa, cinerea, caule erecto, subtereti, pauce ramoso, cortice cinereo; ramis patulis, cortice viridi, puberulis; foliis alternis, subsessilibus, infimis in petiolum brevissimum attenuatis, linearibus, acutis, mucronulatis, crassiusculis, enerviis, glabris, glaucis; spicis brevibus, angustis, in ramis terminalibus; floribus approximatis, 2–3-bracteatis; bracteis parvis, una persistente, carinatis, mucronatis, villosulis; sepalis 5, exterioribus duobus altera paulo superantibus, ovatis, concavis, acutis, 4-nerviis, villosis, interioribus 3-nerviis; staminibus 5; filamentis subulatis, compressis, basi dilatatis atque in cupulam connatis; antheris bilocularibus, ovatis; stylo simplici, tereti, staminibus fere duplo longiore; stigmate capitato, globoso, integro; ovario ovoideo, glabro, uniovulato.—*Achyranthes papposa,* Forsk. MSS.

Hab. Aden, in solo arenoso (*Hook. fil.* ! *T. Anders.*).

Distr. In Arabia Felici.

Some confusion has occurred in the synonomy of this plant. Moquin-Tandon, in De Candolle's 'Prodromus,' has cited Schimper's number 977 as referring to *Saltia papposa*. In the Hookerian Herbarium this number is attached to a species of Convolvulaceæ, *Seddera intermedia*, Hochst. et Steudel (*Cressa* mihi), and, as such, is also quoted by Choisy in the 9th volume of the 'Prodromus,' p. 440. Fearing some mistake in the ticket, I wrote to M. Spach; and he kindly examined Schimper's number 977 in the Paris Herbarium, the specimen seen both by Choisy and Moquin-Tandon. He assures me that it is a true *Seddera*. M. Spach, in addition, corrects an important error in the habitat of M. Botta's specimens of *Saltia papposa* as recorded by Moquin-Tandon. M. Botta did not obtain his specimens at Mount Sinai, but in Arabia Felix—according to his ticket, in "Yemen, environs de Hamara et de Haïs."

Tab. III. Fig. 1, young state of flower; 2, matured fruit and two sterile flowers; 3, single bristle from a sterile flower; 4, one of the five sepals, with stamens and ovary; 5, showing relative position of stamens and ovary; 6, mature fruit, with the persistent stamens at the base. All are magnified.

Ordo XXXIV. PARONYCHIACEÆ.

1. Cometes, *Burm.*

C. Abyssinica (*R. Br. in Wall. Pl. As. Rar.* i. p. 18). Caule erecto, ramoso; foliis oppositis, sæpe uncinato-verticillatis, linearibus, lanceolatis, breviter petiolatis; stipulis scariosis, minutis, subulato-acutis; pedunculis in ultimis ramulis, axillaribus, floribus 3–4; bracteis oppositis, pungentibus, reflexis, villosis, demum aristis pinnatis; calycibus 5-partitis; segmentis marginibus membranaceis, apice fimbriato-ciliatis, duobus exterioribus concavis, pungenti-apiculatis; co-

rolla (vel stamina abortiva) 5-loba; petalis basi in urceolum connatis; staminibus 5, petalis alternis, basi corollæ adnatis; stylo filiformi, simplici; stigmatibus 3, ovariis unilocularibus, utriculo monospermo. —*C. apiculata*, Decaisne in Ann. Sc. Nat. sér. 2. ii. p. 244. *Ceratonychia nidus*, Edgew. in Jour. Asiat. Soc. Beng. xvi. p. 1215.

Hab. Aden (*Edgew.*, *Hook. fil.*!).

Distr. In Arabia Petræa! Muscat! secus littus Sinus Persici! Scinde!

Ordo XXXV. NYCTAGINEÆ.

1. Boerhaavia, *Linn.*

† *Flores paniculati.*

1. B. elegans (*Chois. DC. Prod.* xiii. part. 2. p. 453). Caule erecto, basi fruticoso, albido-puberulo; foliis ovatis lanceolatis vel linearibus acutis mucronatis, margine sinuatis, infimis petiolatis, superioribus sessilibus; paniculis terminalibus laxissimis, ramosis; pedicellis filiformibus, gracilibus; bracteis inconspicuis, oppositis, tomentosis, bracteolis duabus subpersistentibus; perigonio infundibuliformi, paulo inflato, limbo contracto plicato dentato; staminibus 3, inclusis; stylo uno, stigmate capitato-peltato; fructu ovato-clavato, tereti, obtuse 5 costatis, costis eglandulosis, sulcis pilis adpressis sparse puberulis.—*B. rubicunda*, Steud. Nom. p. 213.

Hab. Aden, ubique (*Edgew.*, *Hook. fil. et T*!).

Distr. In Arabia Felici! Beloochistan! Scinde!

Suffrutex 1–3 ped., glaucus, puberulus. *Caulis* teres, obscure striatus. *Folia* superne viridia, puberula, subtus glaucescentia, rugosa, $\frac{1}{2}$–$1\frac{1}{2}$ unc. longa, 3 lin.–$1\frac{1}{2}$ unc. lata; petiolus $\frac{1}{2}$ unc. longus. *Perigonii limbus* glaber, $1\frac{1}{2}$ lin. longus. *Fructus* pyriformis, 2 lin. longus; pericarpum in aqua mucilagineum.

†† *Flores umbellati.*

2. B. scandens (*Linn.*, *Sp. Pl.* ed. 3. p. 14). Suffruticosa, caule diffuse prostrato, elongato, glabro; foliis oppositis, petiolatis, rotundato-ovatis, acuminatis, cordatis, margine repandis, utrinque glabris; umbellis in ramis terminalibus; pedunculis axillaribus 3–7-floris; perigonio tubo subinflato, limbo late infundibuliformi; staminibus 3, exsertis, stylo brevioribus; stylo brevi, stigmate capitato; fructu clavato, truncato, ecostato, apice glanduloso, muricato, pilis strigosis hirtello.—*B. dichotoma*, Vahl, En. i. p. 290. *B. repanda*, Willd. Sp. i. p. 22. *B. scandens*, Forsk. Descr. p. 3. *Valeriana scandens*, Forsk. Descr. p. 12. *B. plumbaginea*, Cav. Ic. ii. p. 7. *B. Burchelli*, Chois. DC. Prod. xiii. part. 2. p. 455. *B. verticellata*, Poir. Dict. v. p. 56. *B. grandiflora*, Rich. Hohen. in Schimp. Pl. Abyss. n. 2309. *B. stellata*, Wight, Icon. t. 875.

Hab. Aden (*Hook. fil.*! *T. Anders.*).

Distr. In Asia tropica! Africa boreali usque ad Cap. Bon. Spei! Hispania! America tropicali, boreali, et australi! Australia! Insulis Galapagos!

This is an exceedingly variable plant; but even in its most aberrant forms the characters of the umbellate inflorescence, exserted stamens and style, and the elongated, clavate, ecostate, glandular fruit, can always be recognized.

Ordo XXXVI. EUPHORBIACEÆ.

1. Euphorbia, *Linn.*

Sect. *Anisophyllum.*

1. E. Ægyptiaca (*Boiss. in Cent. Euph.* p. 13). Caulibus prostratis, teretibus; foliis oppositis, inæqualibus, integerrimis, ovato- vel lineari-oblongis, obtusis, crassiusculis, pilis strigosis hirsutis; floribus axillaribus, solitariis vel 2–3, brevissime pedunculatis; involucro hirsuto, glandulis 5 glabris, dentibus 5, glandulis alternis, ciliatis, hirsutis; ovario stipitato, incano, hirsutissimo, stipite pubescente; stylis non coalitis; seminibus rubescentibus, demum albidis, transversim rugosis. —*E. Forskålii*, Gay in Phyt. Canar. iii. p. 240. *E. arillata*, Edgew. in Journ. Asiat. Soc. Bengal. xvi. p. 1218.

Hab. Aden (*Edgew.*, *Hook. fil.*! *T. Anders.*).

Distr. In Arabia Felici! India boreal.-occid.!

Herba pusilla. *Caules* strigosi, hirsuti, fragiles, 3–6 unc. longi. *Folia* pilis adpressis subincana, 2 lin. longa, ½–1 lin. lata. *Flores* et *capsulæ* minuti, hirsutissimi.

The plant from Aden is so small and strigosely hirsute, with leaves not at all serrated, that it seems almost distinct enough to be ranked as a variety. Judging from his description, Edgeworth seems to have found the normal state of the species.

2. E. Arabica (*Hochst. et Steud. in Pl. Schimp.* n. 756). Erecta, glaberrima; caule tereti ramoso; foliis oppositis, strictis, inæqualibus lineari-lanceolatis vel ovato-lanceolatis, mucronatis, glabris; stipulis angustissime lanceolatis; floribus axillaribus, plerisque solitariis; pedunculo glabro brevi; involucro pyriformi, glabro, dentibus ovatis, fimbriato-ciliatis, glandulis rotundis, intus basi ciliatis; ovario et stipite glabris; stylis divaricatis, ad basin liberis; stigmatibus bifidis; capsula angulata; seminibus lævibus, flavo-rubris.

Hab. Aden, prope mare (*Hook fil. et T.*!).

Distr. In Arabia Felici, in Tehama!

Suffrutex perennis, 4-uncialis, 1-pedalis. *Caulis* lignosus. *Folia* remota vel confertim approximata, 2 lin.–1 unc. longa, 1 lin. lata.

Sect. *Carnosæ et Arboreæ.*

† *Aphyllæ.*

3. E. Schimperi (*Presl. Bemerk.*). Fruticosa; ramis erectis, teretibus, carnosis, trichotomis; foliis deciduis, 1–3, in ultimis ramulis, minutis,

ovatis, acutis, integris; pedunculis terminalibus, brevibus, teretibus, crassis, carnosis, 4-floris; floribus breviter pedicellatis, umbellatis, bibracteatis; bracteis ovatis acutis, basi truncatis, subherbaceis, integerrimis; involucris campanulatis; glandulis 5, concavis; dentibus obtusis, fimbriatis, glandulis brevioribus; staminibus 20, nonnullis exsertis; ovario stipitato, glabro; stylis infra medium coalitis; stigmatibus incrassatis, bifidis.

Hab. Aden (*Hook. fil.*! *T. Anders.*).

Distr. In Arabia Felici!

Frutex aphyllus, carnosus, pallide viridis. *Rami* patuli. *Folia* rarissime adsunt, 3–5 lin. longa, 2 lin. lata, herbacea, glabra. *Pedunculi* 4–5, in apice ramorum umbellato-conferti, 3 lin. longi. *Involucrum* viride; glandulæ et antheræ flavæ.

†† *Superne foliatæ v. foliosæ.*

4. E. CUNEATA (*Vahl, Symb.* ii. p. 53). Caule lignoso, cortice cinereoglabro, ramis rectangularibus, spinescentibus, pauce foliatis; foliis in tuberculis fasciculatis, cuneato-oblongis, cuneato-ovatis vel linearibus, apice obtusis vel obscure bilobatis, basi attenuatis, sessilibus, interdum petiolatis, utrinque tomentellis; pedunculis e tuberculis foliiferis, 3–4-bracteatis, 4-floris; floribus umbellatis, 1 centrali, sessili, 3 pedicellatis; pedicellis pedunculo æquantibus sed gracilioribus; involucro campanulato, tomentoso; dentibus 5, cuneiformibus, fimbriatis; glandulis 5, concavo-peltatis, glabris; staminibus numerosis; ovario stipitato, tomentoso; stylis ad medium connatis, apice subintegris.—*E. fruticosa,* Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1219.

Hab. Aden (*Edgew., Hook. fil.*! *Madden*! *T. Anders.*).

Distr. In Arabia Felici!

Arbuscula 6–10 pedalis, glabra. *Folia* et *flores* partesque juniores puberuli. *Folia* 2–8 lin. longa, 1–3 lin. lata. *Pedunculus* carnosus, teres, puberulus. *Involucrum* viride; glandulæ flavæ.

Descr. of Tab. IV. Fig. 1, leaf; 2, entire flower; 3, longitudinal section of same; 4, scale on petal of the male floret; 5, stamen. All the figures are magnified.

Sect. *Trithymalus.*

5. E. SYSTYLA (*Edgew. in Journ. Asiat. Soc. Beng.* xvi. p. 1218). Erecta, dichotoma; ramis angulosis, adscendentibus; foliis alternis, valde petiolatis, lanceolatis, lineari-lanceolatis, integris, mucronatis, puberulis; floribus axillaribus solitariis, sessilibus; involucro tubuloso, persistente, 4-dentato, dentibus fimbriatis, glandulis 4 concavis alternis; ovario pubescenti, stipite incrassato, tomentoso, stylis ad apicem coalitis, stigmatibus bifidis. Capsula erecta, subglobosa, puberula; coccis bisulcis, angulatis, angulis rotundatis; seminibus conicis, compressis, constrictis, testa crustacea, punctata, olivacea.

Hab. Aden, a littore usque ad altitudinem 1000 ped. in monte Jibeel Shumshum (*Edgew., Hook. fil. et T.*! *Madden*!).

Suffrutex 2–3-pedalis. *Caulis* dichotomus, striatus, subglaucus, plus minus foliatus. *Folia* puberula, $\frac{1}{2}$–$1\frac{1}{2}$ unc. longa, 1–3 lin. lata; petiolus 6 lin. longus.

Descr. of Tab. V. Fig. 1, entire flower; 2, longitudinal section of same; 3, petal and stamen of a male floret; 4, mature fruit; 5, ripe seed. All the figures are more or less magnified.

2. Crozophora, *Neck.*

1. C. oblongifolia (*Ad. Juss., Spr. Syst.* iii. p. 850). Suffruticosa; caule suberecto, floccoso, tomentoso; ramis dichotomis, foliosis; foliis petiolatis, subpeltatis, oblongis, lanceolatis, acutis, dentatis, dense stellato-floccosis, basi biglandulosis; racemis abbreviatis, in ramis terminalibus; floribus bracteatis, breviter pedicellatis, monoicis; floribus masculinis calyce 5-partito stellato tomentoso, petalis 5 glabris, staminibus 8–10, filamentis subcoalitis; femineis calyce 10-partito, corolla nulla, ovario sessili, capsula globosa tricocca stellato-glandulosa, seminibus rugosis.—*Croton oblongifolium*, Del. Ægyp. tab. 51. f. 1.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Felici et Petræa! Muscat! Scinde! Ægypto!

3. Jatropha, *Linn.*

1. J. spinosa (*Vahl, Symb.* i. p. 79). Fruticosa, erecta; ramis teretibus, incrassatis; cortice cinereo-glauco vel purpurascente; foliis alternis, petiolatis, rotundatis, 5–7-nerviis, 3–5-lobatis vel obscure 7-lobatis, lobis oblongis, obtusis, obscure dentatis, utrinque glabris; stipulis pungenter spinosis, subpersistentibus; corymbis pedunculis elongatis, terminalibus, dichotomis, multifloris; bracteis parvis, basi dilatatis, acutis, scariosis; floribus subsessilibus, monoicis; calyce 5-partito, petalis 5; staminibus 8; ovario sessili; stylis convolutis, 3, liberis, stigmatibus peltatis; capsulis rugosulis, lignosis, tricoccis, coccis monospermis.—*Croton spinosum*, Forsk. Descr. p. 163.

Hab. Aden (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici.

Arbuscula 7–8-pedalis, succo lacteo. *Caulis* aculeatus, rami incrassato-carnosi. *Folia* $1\frac{1}{2}$ unc. longa, $1\frac{1}{2}$–2 unc. lata; petiolus 1–$1\frac{1}{4}$ unc. longus; stipulæ aculeatæ, nigræ vel glaucæ, 3 lin. longæ. *Corymbi* 4–5 unc. longi. *Flores* flavescentes, plurimi subsessiles, feminei paucissimi, in dichotomia corymborum sessiles.

Descr. of Tab. VI. Fig. 1, entire male flower; 2, same laid open; 3, female flower; 4, same with the floral envelopes removed.

Ordo XXXVII. URTICACEÆ.

1. Forskohlea, *Linn.*

1. F. tenacissima (*Linn. Mant.* p. 72). Suffruticosa; caule et ramis aculeato-asperis; foliis petiolatis, orbicularibus, ovatis vel rhomboideis,

grosse serratis, utrinque scaberrimis, superne subviridibus, subtus dense incano-tomentosis, nerviis subglabris, viridibus; capitulis axillaribus, sessilibus, geminis vel quaternis, 4–5-foliolatis, foliolis lanceolatis vel rotundatis, acutis, albidis, ciliatis, pilosis.—*Caidbeja adhærens*, Forsk. Descr. p. 82.

Hab. Aden, rarissime, in locis depressis (*Hook. fil.* !).

Distr. In Arabia Felici ! et Petræa ! in oris Sinus Persici ! India boreal. occid !. Ægypto ! Algeria ! Hispania !

Herba 1–2-pedalis asperrima. *Caulis* lignosus, ramosus. *Folia* ½–1 unc. longa, ½ unc. lata; petiolus 4 lin. longus. *Capitula* petiolum æquantia; cilia involucri viridescentia.

Ordo XXXVIII. GNETACEÆ.

1. Ephedra, *Tourn.*

1. E. foliata (*Boiss. in Kotsch. Pl. Pers. Aust. et Diag. Pl. Or.* vii. p. 100). Fruticosa; caule striato, ramis angulatis, ramulis verticellato-fasciculatis, teretibus, puberulis, junceis, elongatis, ramosis remote articulatis; foliis quaternis, teretibus, subulatis, elongatis, mucronatis, basi membrana, caule vaginante connatis; spicis masculinis lateralibus vel ad apicem ramulorum aggregatis, subsessilibus; staminibus 3; floribus femineis 3–9, in ramulis trichotomis terminalibus pedicellatis, involucris margine scarioso-ciliato.—*E. ciliata,* Fisch. et Mey. in Meyer, Monog. Gener. Ephedræ, p. 100.

Suffrutex 2–3-pedalis, gracilis. *Caulis* subglaucus, striatus; ramuli floriferi 2–4 unc. longi, subtetragoni, sulcato-striati, fasciculati. *Folia* 8–10 lin. longa, superiora sæpe bina. *Spiculæ* masculinæ 3–4 lin. longæ, multifloræ.

Hab. Aden (*Hook. fil. et T.* !).

Distr. In Persia ! Affghanistan ! India boreal.-occid. !

Classis II. **MONOCOTYLEDONES.**

Ordo XXXIX. AMARYLLIDEÆ.

1. Pancratium, *Linn.*

1. P. tortuosum (*Herbt. in Herb. Hook.*). Bulbo ovato; foliis linearibus, attenuatis, acutis, viridibus, canaliculatis; scapo brevi, non subterraneo; spatha breviter pedunculata vel subsessili, membranacea, bifida, triflora; perigonii tubo gracili, limbo quadruplo longiore, limbi laciniis linearibus, acutis, coronæ, ultra medium liberis, dentibus acute triangularibus; stylo et filamentis coronam superantibus.—*P. tortifolium,* Boiss. Diag. Pl. Orient. xiii. p. 18.

Hab. Aden, in convallibus saxosis (*T. Anders.*).

Distr. In Arabia Felici, prope urbem "Jeddah" !

Folia sæpe tortula, 6–10 unc. longa, 3 lin. lata. *Scapus* 2 unc. longus.

Spatha 2½ unc. longa. *Perigonium* album, tubo incluso 5–7 unc. longum.

My plant, though not in flower, is doubtless the same as Herbert's species. It grows in clumps in one or two of the narrow valleys in Aden. Boissier quotes Schimper's number as 676; but the plant in the Hookerian herbarium is marked 876. My description is drawn partly from my own specimens and partly from the MS. diagnosis of Herbert in the Hookerian herbarium.

Ordo XL. CYPERACEÆ.

1. Cyperus, *Linn.*

1. C. conglomeratus (*Rottb. Gram.* t. 15. fig. 7). Glaucescens; radice fibroso, tomentoso, culmis erectis e denso foliorum cæspite plurimis, rare solitariis, striatis, obtuse triquetris; foliis erectis, rigidis, subteretibus, canaliculatis, mucronulatis, margine scabridis, basi culmis vaginantibus, purpurascentibus; involucro 3–4-phyllo, inæquali; foliolis 2, capitulum superantibus, uno inferiore, altero longiore; umbellis in apice culmorum capitatis, solitariis, subsessilibus, vel plurimis inæqualiter pedunculatis, radiatis; spiculis 5–20, sessilibus, oblongis, obtusis, compressis, imbricatis, multifloris; squamis ovatis, obtusis, plurimi-nerviis, carinatis; stylo trifido.

Hab. Aden, in locis depressis prope littus (*Hook. fil. et T.! T. Anders.*).

Distr. In Arabia Felici! et Petræa! oris Sinus Persici! Ægypto! Algeria!

Planta magnitudine variabilis, plerumque pedalis, sed marcescentia 2–3-uncialis; radicibus exceptis, glaberrima. *Folia* culmos non superantia; involucri foliolum foliis longius, 3–4 unc. longum, radii ½–1½ unc. longi.

Edgeworth does not enumerate this species among the plants found by him at Aden, but records *Cyperus effusus* and *Jeminicus*, Rottb., neither of which occurs in any of the Aden collections that I have examined.

Ordo XLI. GRAMINEÆ.

Tribus Paniceæ.

1. Tricholæna, *Schrad.*

1. T. Teneriffæ (*Parlat. in Webb, Phyt. Can.* iii. 425). Caule basi plus minus repente, ramoso, pubescente, demum adscendente, foliato, nodis vaginisque tomentellis; ligula pubescente, ciliata; foliis marginibus involutis, abbreviatis, apice attenuatis, mucronato-acutis; paniculis laxis, nodis pilosis, spicis compositis ternatis, multifloris, pedicellis ramosis, filiformibus, flexuosis, apice incrassatis; spiculis solitariis, bifloris, sericeo-pilosis, pilis gluma duplo longioribus; gluma exteriore nulla, interioribus 2-nerviis, obtusis, dorso ciliatis; flore masculino uno, palea binervis, apice obtusa, ciliato-dentata; staminibus 3; stylis attenuatis, apice barbatis; achenio nigrescente.—*Panicum Teneriffæ*, R. Br. in Prod. i. p. 39; *Saccharum Teneriffæ*, Linn. fil. in Suppl. p. 106;

Tricholæna micrantha, Schrad. in Rœm. et Schult. Syst. Veg. Mant. ii. p. 163; *T. leucantha,* Hochst. in Schimp. Pl. Abyss. n. 1818; *Saccharum? dissitiflorum,* Edgew. Journ. Asiat. Soc. Beng. xvi. p. 1219.

Hab. Aden (*Edgew., Hook. fil. et T.* !).

Distr. In insulis Capitis Viridis! et insulis Canariensibus! oris Africæ borealis! et in insula Sicilia! Abyssinia! a peninsula Arabiæ usque ad Scinde!

2. Panicum, *Linn.*

1. P. viride (*Linn., Sp. Pl. Willd.,* i. p. 335). Radice fibroso, glabro; culmo basi decumbente vel erecto, ligulis ciliatis; foliis lanceolatis, acuminatis, acutis, planis, margine scabris vaginis striatis, pubescentibus; paniculis solitariis, densis, cylindricis, spiciformibus, setis scabris asperis; setis spicula plus minus longioribus, ad basin spiculæ solitariis; spiculis sub-bifloris; glumis exterioribus obscure 4–6-nerviis, glabris; gluma florifera (glumella) ovata, obtusa, enervi, striata, tuberculata, subcrustacea.—*Setaria viridis,* Pal. de Beauv. Agr. t. 14. f. 3.

Hab. Aden, in umbris arbuscularum (*T. Anders.*).

Distr. In toto orbe calidiore.

Annua, in Aden, herba pusilla 3–6 uncialis. *Paniculæ* interdum simplices.

3. Pennisetum, *Pal. de Beauv.*

1. P. cenchroides (*Rich. in Pers. Syn.* i. p. 72). Culmo erecto, ramoso, glabro; vaginis glabris, margine ciliatis, ligula barbato-ciliata; foliis linearibus, acutis, planis, pilosis; paniculis solitariis spiciformibus, cylindricis, obtusis; involucri setis aristæformibus, inæqualibus, basi plumosis, apice purpurascentibus; spiculis 2–3-floris; gluma florifera (glumella) subcartilaginea, 3-nervia; ovario glabro; stylis inferne connatis, plumosis.—*Cenchrus ciliaris,* Linn. Mant. p. 320; *P. rufescens,* Spreng. in Schimp. Pl. Arab. n. 153; *Cenchrus pennisetiformis,* Hochst. et Steud. in Schimp. Pl. Arab. n. 973; *P. ciliare,* Link, Hort. Ber. ii. p. 216; *P. distylum,* Guss. Fl. Sic. Prod. Suppl. i. p. 12; *P. ciliatum,* Parlat.

Hab. Aden, in locis depressis arenosis (*Hook. fil. et T.* !).

Distr. In locis aridis regionum calidiorum Africæ et Asiæ.

Tribus Stipaceæ.

4. Aristida, *Linn.*

1. A. Adscensionis (*Linn. Sp. Pl.* p. 121). Radice fibroso, tomentoso, culmis plurimis decumbentibus vel erectis, vaginis nodisque glabris, ligulis obscure vel barbato-ciliatis; foliis linearibus, acutis, involutis, margine scabris; paniculatis, coarctatis, subsecundis, basi interruptis; spiculis unifloris; glumis subulatis inæqualibus, muticis, glabris; gluma florifera (glumella) apice triaristata, aristis scabris.—*A. cærulescens,*

Desf. Fl. Atl. t. 21. f. 2; *A. depressa,* Retz. Obs. iv. p. 22; *A. vulgaris,* Trin. et Rupr. Stip. 131; *A. gigantea,* Linn. fil. Suppl. p. 113; *A. Canariensis,* Willd. Enum. p. 99; *A. Mauritiana,* Kunth. Gram. i. p. 265, t. 44; *A setacea,* Retz. Obs. iv. 22, in Jacq. Pl. Ind. Orient. ex Herb. Mus. Paris.; *A. Hystrix,* Roxb. Fl. Ind. ed. 1832, p. 350, fide Planchon, in herb. Hook.

Hab. Aden, rarissime (*Hook. fil. et T.*!).

Distr. Ab insulis Canariensibus per Africam borealem et centralem usque ad Ceylaniam atque Indiam orientalem.

Species variabilis, 3-uncialis vel fere 2-pedalis, plerumque glabra; nodi glabri. *Paniculæ* sæpe purpurascentes; setæ 4–6 lin. longæ, scabræ vel sublæves.

I have not given all the synonyms for this plant, but only those names that are important with reference to the flora of Arabia and India.

5. Stipagrostis, *Nees.*

1. S. plumosa (*Munro, MSS. in Herb. Benth.*). Cæspitosa; radice fibroso, fibris crassiusculis tomentosis; caulibus plurimis, basi vaginis marcidis vestitis, glabris, nodis constrictis, vaginis glabris apice ciliatis; foliis rigidulis, linearibus, mucronato-acutis, margine involutis; paniculis oblongis, laxis, simplicibus; ramulis capillaribus, alternis, flexuosis; pedicellis filiformibus, flexuosis, glabris, apice incrassatis; glumis inæqualibus, oblongo-lanceolatis, glabris vel puberulis, interiore exteriorem superante; gluma florifera (glumella) oblonga, involuta, tubulosa, chartacea, 3-nerva, tuberculata, longissime aristata, aristis articulatis, tortis, erectis, canaliculatis, papilloso-scabris; laciniis lateralibus barbatis, lacinia media laterales triplo quadruplo superante, plumosa; palea cuneato-obovata, apice truncata, involuta, hyalina, glaberrima.—*Aristida plumosa,* Linn. Sp Pl. p. 1666. *A. lanata,* Forsk. Descr. p. 25, *Arthratherum plumosum* in Coss. et Dur. Fl. Alg. p. 82. *A. pogonoptilum,* Jaub. et Spach, Ill. Pl. Or. iv. p. 56, t. 337. *Aristida Paradisea,* Edgew. Journ. Asiat. Soc. Bengal, vol. xvi. p. 1219.

Hab. Aden (*Edgew., Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici! et Petræa! per Asiam calidam usque ad Punjab. In Abyssinia et Ægypto.

Gramen gracile et formosum. *Aristidæ ciliatæ,* Desf., proxima, sed differt foliis non abbreviatis, culmis ad nodos glabris, vaginis inconspicue ciliatis, et stipite aristæ non torto.

Tribus Chlorideæ.

6. Tetrapogon, *Desf.*

1. T. villosum (*Desf. Fl. Atl.* ii. p. 389, t. 255). Cæspitosum; radice fibroso-tomentoso; culmis paucis, erectis, basi dense vaginatis, foliatis, ad nodos glabris; vaginis striatis, glabris, rarissime infimis pilosis, supra medium margine scarioso; ligula inconspicua, non ciliata;

spicis terminalibus, solitariis, densissimis, sericeo-villosis, folio spathiformi involucratis; rachibus sæpe geminis, cohærentibus; spiculis 3–4-floris, longe pilosis; flosculis inferioribus hermaphroditis, superioribus sterilibus; glumis membranaceis, breviter acuminato-aristatis, persistentibus, glabris; exteriore villosa, longe aristata, cucullata, interiore obtusa, ciliata; gluma florifera (glumella) solitaria, villosa, aristata.—*Chloris villosa,* Pers. Syn. i. p. 87. *C. Tetrapogon,* Pal. de Beauv. Agrost. p. 158.

Hab. Aden! (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! et Felici! Scinde! Algeria, et insulis Canariensibus!

7. Dactyloctenium, *Willd.*

1. D. Ægyptiacum (*Willd. Enum.* 1029). Cæspitosum; caule prolifero repente, radicante; culmis adscendentibus; vaginis basi tuberculatis, pilosis, superne glabris; ligulis ciliatis; nodis constrictis, glabris; foliis lineari-lanceolatis, acutis, planis, margine papillis piliferis sparse tuberculatis; spicis terminalibus, horizontalibus, digitatis, ternatis vel quaternatis, crassiusculis, densis; rachi in mucronem prolongata; spiculis imbricato-unilateralibus, 3–5-floris; glumis acutis marginatis, minute ciliatis, carinatis, exteriore breviore, aristata, arista spiculis longiore; florifera (glumella) acuta, carinata, glabra, bifida; palea carinata, mucronata, aristata; semine transversim ruguloso.—*Cynosurus Ægyptius,* Linn. Syst. Pl. p. 185. *Eleusine Ægyptiaca,* Roxb. Fl. Ind. ed. 1832, i. p. 344. *D. mucronatum* et *D. prostratum,* Willd. Enum. 1029. *D. australe,* Steud. Gram. p. 212. *D. aristatum,* Link, Hort. i. p. 50. *D. Figarei,* Notar. (Steud. *l. c.*). *D. distachyum,* Bojer, Hort. Maurit. p. 370. *Chloris mucronata,* Mich. Flor. Bor.-Amer. i. p. 59.

Hab. Aden (*Hook. fil. et T.*!).

Distr. Per totum orbem calidiorem.

Tribus Festucaceæ.

8. Eragrostis, *Beauv.*

1. E. ciliaris (*Link, Hort. Ber.* i. 192). Radice fibroso; culmis ramosis, geniculatis; vaginis papilloso-tuberculatis, pubescentibus, apice ciliatis; foliis anguste linearibus, planis, patentibus; paniculis coarctatis, thyrsiformibus, interruptis vel continuatis, compositis; spiculis 6–12-floris; glumis membranaceis, naviculæformibus, acutis, carina barbata; gluma florifera (glumella) mucronata, 3-nervi; palea ciliata. —*Poa ciliaris,* Linn. Sp. ed. Willd. i. p. 402. *E. pulchella,* Parlat.

Hab. Aden (*T. Anders.*).

Distr. In Arabia Felici! India! et Ceylania! per totam Africam! in insula Adscensionis! in America australi ad Para!

This is an exceedingly variable plant; my specimens from Aden are only about 1½ inch high.

9. ÆLUROPUS, *Trin.*

1. Æ. ARABICUS (*Steud. Nomencl.* p. i. 30, *Gram.* p. 298). Culmis repentibus, numerosis, ramosissimis, elongatis, teretibus, incrassatis, vaginis persistentibus imbricate vestitis; vaginis margine ciliatis; ligula nulla; foliis brevissimis, rigidis, subulatis, pungenter mucronatis, glaucis; paniculis in ramis terminalibus ovatis, conglomeratis; rachi pubescente, spiculis multifloris; glumis 2, obovatis, muticis, scariosis, carinatis; gluma florifera subpatente, sericeo-ciliata, pubescente, ad apicem glabra, 3-nervi, paleam paulo superante, mucronulata; palea binervi, mucronulata vel mutico-obtusa; caryopsidibus ovatis, obtusis, glabris.—*Calotheca Arabica,* Spr. Syst. Veg. i. p. 348. *Festuca mucronata,* Forsk. Descr. p. 22. *Festuca pungens,* Vahl, Symb. i. p. 10, t. 2. *Dactylis mucronata,* Steud. Gram. p. 298.

Hab. Aden, in arenosis (*Hook. fil.*! *T. Anders.*).

Distr. In Arabia.

Cæspitosus, horridus, 2–3-pedalis. *Culmi* vaginis marcidis occulti. *Folia* glauca, ½ unc. longa. *Paniculæ* pubescentes, 1 unc. longæ.

ADDENDUM.

SINCE the printing of this *Florula*, I have seen a specimen of a *Fissenia*, collected at Aden by Dr. Courbon, of the French exploring expedition under the command of Captain Russel, and kindly communicated to Dr. Hooker for my inspection by Prof. Brongniart of Paris. This is the plant upon which Brown founded the genus, and of which I have examined his original specimen in the British Museum: it does not, however, bear the name *Fissenia*, but *Kissenia*, in honour of its discoverer, M. Kissen, a traveller in Arabia. Endlicher, who is responsible for the spelling *Fissenia*, probably obtained the generic name for the South African species, orally, from R. Brown. After a careful comparison of the Arabian and South African specimens, I can find no difference, and I therefore

propose that R. Brown's name of *K. spathulata* be substituted for *F. Capensis* (and *Cnidone Mentzeloides*).

Ordo LOASACEÆ.

KISSENIA, *R. Br.* (*Fissenia*, Endl. [*errore*].)

Calycis tubus cum ovario connatus, 10-costatus; limbus 5-partitus, lobis æqualibus. *Petala* 10, decidua, in apice calycis tubi inserta; 5, calycis lobis alterna, rotunda, concava; 5, calycis lobis opposita, minora, ligulata, incurva. *Stamina* indefinita; antheris bilocularibus, introrsis. *Ovarium* triloculare; loculis uniovulatis.

1. K. SPATHULATA (*R. Br., MSS. in Herb. Mus. Brit.*). Caule erecto, striato, papillis scabris aspero; foliis alternis, petiolatis, inferioribus 3–7-lobis, superioribus lineari-lanceolatis, bracteiformibus, acutis, grosse sinuato-dentatis, utrinque asperrimis; calycis tubo ovato, in fructu 10-costato, costis pilis fulvis tomentosis; limbo 5-partito; lobis longe spathulatis, subherbaceis, 3-nerviis; petalis 10, biseriatis, calyce multo brevioribus, 5 majoribus calycis lobis alternis, carinatis, ovatis, concavis; 5 minoribus lobis oppositis, ligulatis, angulatim incurvis; stylis 3, brevibus; fructu lignoso, 3-loculari, sæpe abortu monospermo; seminibus ovatis, compressis.—*Fissenia Capensis*, Endl. Gen. Plant. Suppl. ii. p. 76, absque descriptione. *Cnidone Mentzeloides*, E. Mey. in Herb. Drège, et Presl, Bot. Bemerk. p. 73. *Fissenia Capensis*, Harvey in Thesaur. cap. i. p. 61, et t. 98, sub nomine *F. Mentzeloides*, R. Br.

Hab. Aden (*Courbon* !).

Distr. In Namaqualand, regione subtropica Africæ austro-occidentalis!

Frutex sublignosus, asperrimus, 4–5-pedalis. *Cortex* pallidus. *Folia* 2 unc. longa, 1–1½ unc. lata; *petiolus* ½ unc. longus, teres, striatus, basi dilatatus, in nervum prominentem prolongatus. *Calyx* accrescens, in fructu 1½ unc. longus; lobis reticulato-nervatis, scabris. *Corolla* calycis lobis dimidio brevior, straminea.

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Printed by Taylor and Francis, Red Lion Court, Fleet Street.

Fropiera Mauritiana, *Bouton.*

Vincent Brooks Imp.

Barteria Nigritana, *H. f.*

W. Fitch del. et lith.

Sphærocoma Hookeri, *T. Anders*

JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

SECOND SUPPLEMENT TO VOL. V.—BOTANY.

CONTAINING

NOTES ON AURANTIACEÆ.

BY DANIEL OLIVER, ESQ., F.L.S.;

AND ON

MENISPERMACEÆ, TILIACEÆ, BIXACEÆ,

AND

SAMYDACEÆ.

BY GEORGE BENTHAM., ESQ., V.P.L.S.

LONDON:
SOLD AT THE SOCIETY'S APARTMENTS, BURLINGTON HOUSE;
AND BY
LONGMAN, GREEN, LONGMANS AND ROBERTS,
AND
WILLIAMS AND NORGATE.
1861.

PRINTED BY TAYLOR AND FRANCIS,

RED LION COURT, FLEET STREET.

SUPPLEMENT

TO THE

JOURNAL OF THE PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

The Natural Order *Aurantiaceæ*, with a Synopsis of the Indian Species. By DANIEL OLIVER, Esq., F.L.S., Professor of Botany in University College, London.

[Read December 6th, 1860.]

THE review of the genera of the natural order *Aurantiaceæ** and synopsis of the Indian species which I am now permitted to lay before the Linnean Society, is chiefly based upon the examination and dissection of very numerous specimens in the large collection, belonging to that family, contained in the Kew Herbarium.

Of the papers upon the genera and inter-generic relations of the

* Exclusive of the species of *Citrus*. Feeling it utterly hopeless usefully to define them, I have thought it best to leave the Oranges, Lemons, Limes, and their allies as I found them. It has been difficult to form, for purposes of comparison, any satisfactory approximate estimate of the number of species in this very variable and widely cultivated genus. From the data afforded by Risso, Loureiro, Wight and Arnott, Miquel, and others, and from what I have myself seen of dried or living specimens, I have assumed five as about the probable number. Roemer, in his 'Synopses Monographicæ,' enumerates (exclusive of some dubious names of Rafinesque's) between thirty and forty species! This botanist institutes moreover no fewer than seven new genera of *Aurantiaceæ*. I do not consider that any of them can, with advantage, be adopted. His work is made up apparently from published descriptions of species without examination of specimens; the same species occurring sometimes two or three times over, and not always in the same genus. I wholly agree with M. Planchon's observation in 'Hortus Donatensis,' (p. 18 in note), on the '*Aurantiaceæ*' of the 'Synopses.'

Aurantiaceæ which require a brief allusion here, one of the earliest and most important is certainly the essay of Correa de Serra in the 'Annales du Museum'*, entitled "*Observations sur la Famille des Orangers et les Limites qui la circonscrivent.*" Considering the period, a remarkably good appreciation of natural affinities is manifest, both in the observations upon those characters which he conceived to be available for the purpose of generic grouping, as well as in the redistribution of the genera of *Aurantiaceæ* there proposed. In this paper, *Atalantia* and *Glycosmis*, new and natural genera, were founded; while, on the other hand, one or two previously published genera (*Bergera, Chalcas, Clausena*) were merged. The opinion of Correa de Serra that *Bergera* is not generically distinct from *Murraya* I coincide in, though I should scarcely perhaps have united them, had I not had the opportunity of examining an Archipelago plant of Lobb and Cuming, from the Philippines, which supplies an important connecting link between them. I do not, however, agree with him, and with Sprengel, that *Clausena* should be, in like manner, united with *Murraya*. The addition of new forms since Correa wrote, tends to establish *Clausena* as one of the more distinct generic types of the order. As in *Clausena*, so also in most of the genera, new species from India, Eastern Asia, the Archipelago, Australia, and Africa, have materially altered the aspect of the family; and as these accumulating materials have been too often published from insufficient data and without the advantage of herbarium comparison, and have been also allocated on very artificial, if not on arbitrary grounds, the order would seem about to fall into a sort of ill repute in consequence of the best types for the systematist having thus become almost entirely swamped.

Correa de Serra† regarded the genus *Citrus* as expressing the type and centre of affinity of the *Aurantiaceæ*. If in the species known at the present time, the numerical proportion of those presenting numerous important structural features in common be the main element in determining the type, it can scarcely be said that the multilocular ovary, numerous ovules, and numerous usually polyadelphous stamens of the genus *Citrus* permit it fairly to represent the order. The number of species having normally five cells, or fewer, to the ovary, ovules solitary or in pairs, and stamens very rarely normally exceeding ten, I estimate approximately at about sixty (53 to 75); these at present are referred to ten genera. Of polyandrous, multiovulate species, I reckon but about ten or eleven,

* Tom. vi. (1805) p. 376.

† *Loc. cit.* p. 378.

belonging to three or four genera. Nevertheless I consider that it is in the genus *Citrus*, or at any rate in the group *Citreæ*, that the maximum departure, not of aberrant character, from all other ordinal types is obviously attained.

The *Citreæ* are a little abruptly separated from the rest of *Aurantiaceæ*. There are, however, remarkable bonds of union in two species from Eastern Asia, one of which I consider must for the present remain in *Atalantia (A. Hindsii)*; the other, half *Citrus*, half *Atalantia*, may perhaps be regarded of generic mark, though, in the absence of fruit, I have not ventured to describe it under a new name. The genera which it immediately connects seem too far removed to admit of its being appended to either without very unduly weakening their diagnostic formulas; to maintain which without sacrificing too greatly the conception of a natural group, is as essential to their practical utility as is the maintenance of natural generic assemblages as resting-points for the philosophical study of plants. It is through the genera *Atalantia* and *Paramignya* (unifoliolate groups), and *Feronia*, that the true oranges further link themselves with the larger, 3-multifoliolate section of the order. The tendency so common in *Citrus* to union, more or less, of the filaments is noticeable in two genera, *Atalantia* and *Luvunga*; the former with collateral, the latter with superimposed ovules. *Atalantia* manifests a further affinity to *Citrus* in its shining unifoliolate leaves and general *primâ facie* features. The increased number of stamens in *A. Hindsii*, and their irregular polyadelphous condition, indicate yet more their intimate relationship. In all the remaining genera of *Aurantiaceæ*, apart from *Citreæ*, I find the filaments constantly free.

From the position of the *Aurantiaceæ* in the classificatory sequence of the 'Prodromus,' the order was among the earliest published in that important work (in vol. i. p. 535). M. DeCandolle's materials were limited, and as the discoveries which have since been made are numerous, his monography is now comparatively useless. He describes thirty-four species, exclusive of incertæ. Blume's important descriptive contribution appeared in 1825 in his 'Bijdragen tot de Flora van Nederlandsch Indië:' he confines himself to the species growing in Java, wild or cultivated, of which he published two new genera—*Sclerostylis* and *Micromelum*. The difficulty of clearing up my doubts by a sight of authentic specimens of Blume's species has pressed upon me, and is perhaps the chief reason why I have not aimed at a more complete monograph of

the order*. *Sclerostylis* I think cannot be maintained, and most of the Indian species referred to it by recent writers I unite with *Atalantia*. *Micromelum* offers one or two peculiar features, and is, I consider, a good genus. These genera I notice in further detail in the remarks upon the several generic groups.

It is to Messrs. Wight and Arnott that we owe the first good digest of the genera. This appeared in their 'Prodromus Plantarum Peninsulæ Indiæ Orientalis;' some further observations are added by Dr. Wight in his 'Illustrations of Indian Plants.' Although they confined themselves to Indian members of the order, yet as nearly all the genera are represented in India, their observations have a general interest. The sections which they propose, *Limoneæ* and *Clauseneæ*, dependent upon the ovules being collateral or superimposed in the biovulate species (uniovulate species are included in the former section), are adopted by Meisner, by Endlicher in his 'Genera Plantarum,' and other botanists. I may observe that, to estimate the value of character afforded by the relative position of the ovules in *Aurantiaceæ* demands considerable caution. In some genera the ovules are constantly, and apparently entirely, superimposed, the upper ovule ascending or peltate, the lower pendulous (*Micromelum pubescens*); in others, the ovules are usually superimposed more or less obliquely, at times becoming almost or quite collateral. Indeed, in the same species, sometimes in the same ovary, both partially superimposed and collateral ovules may be found (*Murraya crenulata* and *Limonia alata*). Other species, again, appear to have their ovules invariably side by side, as in the biovulate species of *Atalantia*. In perhaps all of the biovulate *Aurantiaceæ* the ovules are attached to the placenta very nearly or precisely at the same level; when they are superimposed, the lower is furnished with a very short funicle, and is almost always dependent or pendulous, while the superior ovule is peltate, or more or less laterally attached. In the collateral-ovuled species the pair may be alike pendulous or laterally affixed.

Altogether, after the dissection of a very large number of flowers, I am of opinion that, like many other absolute, isolated, diagnostic characters, this breaks down in too many cases to render it of subordinal, or indeed of generic, value, unsupported by additional

* I have felt a like difficulty in respect to the species described by Blanco in his 'Flora de Filipinas.' Though most of his plants are probably in our herbaria, and familiar to me, yet I cannot certainly identify them with his descriptions.

peculiarities. Other points prominent in the "Clavis Generum" of Wight and Arnott are the number of cells in the ovary and the number of ovules (whether one or two) in each cell. So many species are very variable and inconstant in respect to the number of cells in the ovary, although probably each (exclusive perhaps of the multilocular genera) may have its prevailing normal standard, that this character is in constant danger of misleading the student if too generally insisted upon, as is also the one-ovuled or two-ovuled cell.

Though Messrs. Wight and Arnott's synopsis is the best I have seen, yet certainly the "genera" are there too precisely circumscribed to find answering to them among the defiantly loose relationships of plant life, either "entities" or abstractions of any available sort for the systematist.

The genus *Rissoa*, published by Arnott in the 'Nova Acta Acad. Nat. Cur.*' is founded upon a true *Atalantia* (*Sclerostylis*) as intimated by Dr. Wight†. Mr. Dalzell published in the 'Journal of Botany and Kew Miscellany'‡ a new genus of the order, *Piplostylis*. This genus very nearly approaches *Clausena* and also *Murraya* (including *Bergera*); and I have, after a good deal of deliberation, thought it best to unite it with the former genus. The genus *Papeda* of Hasskarl§, apart from his description and reference, I am unacquainted with. Professor Miquel in his 'Flora Indiæ Batavæ' describes nothing new, nor does he introduce any novel treatment. Mr. Thwaites, in 'Enumeratio Plantarum Zeylaniæ‖,' in a list of eighteen species, describes four as new, one of which he makes the type of a new genus *Arthromischus*. I give below reasons why I cannot unite with this excellent botanist in maintaining the genus (p. 20).

In working up the species I have had advantages which I cannot over-estimate in respect to amount of material and the free permission most liberally granted me by Sir William and Dr. Hooker to avail myself fully of it. Besides the Kew Collection, I have gone over the *Aurantiaceæ* of the Wallichian and British Museum herbaria; Dr. Lindley also has kindly permitted me to examine his valuable set. The species of which I have recast the diagnoses are chiefly Indian. Specimens from Java and the Archipelago, while enabling me to estimate generic characteristics, are not proportionally represented in the herbaria to which I have had

* Vol. xviii. p. 324. † Illust. Ind. Pl. vol. i. p. 109.
‡ Vol. iii. p. 33. § Cat. Hort. Bog. alter, p. 216. ‖ P. 44.

access, and I have generally abstained from an attempt to base new or modified diagnoses upon them.

One result, especially in the case of one or two species, of this extended correlation of specimens, has been peculiarly interesting; showing, as I consider, different varying tendencies in different geographical areas occupied by them. In the case of *Micromelum pubescens*, e. g. the form originally described by Blume, growing in Java, presents moderately-sized flowers (2–3 lines), with a cupulate, almost quite entire or slightly undulate-dentate margin, the leaflets usually from 2½–3½ inches long, by 1–1½ broad, the style exceeding or not shorter than the ovary. The same form we have from Penang. In Ceylon we find the calyx more decidedly lobulate (dentate-lobulate), the style comparatively long, usually rather exceeding the ovary, the leaflets commonly narrower in proportion, varying usually from 1½–3½ inches in length, by ½ to 1½ inch in breadth. I have not seen specimens from the western peninsula of India*. In the north-east, in Sikkim, Nipal, and Assam, a strong form occurs with rather larger flowers varying from 2–3½ lines, in very broad corymbose cymes—the calyx triangularly lobate; leaflets 3½–6 inches long, by usually 1½–2 inches broad; the style moderately long, about equalling, not exceeding, the ovary.

Returning to the islands: in the Western Pacific,—Friendly Islands, Fijis, and New Caledonia,—another form occurs with flowers altogether smaller, scarcely reaching 2 lines; calyx dentate-lobulate, the style short, shorter than, or scarcely equalling, the ovary, which is frequently 4-locular, the leaflets usually broader in proportion to their length, and more decidedly ovate—from 1½–3½ inches by 1–2¼ inches. This is the *Micromelum glabrescens*, Bth., *Limonia minuta* of Forster, as pointed out by Dr. Asa Gray. Then again in Australia and its adjacent islands (Endeavour River, Wide Bay, Cape Upstart, Port Essington, Cairn Cross Island, &c.), we find a form very nearly allied to the last named, often drying a yellowish brown colour, and with the ovary varying with 4–5 or 3 cells; the young fruit too varies in amount of pubescence. A corresponding series of phases, other characters being affected, is offered by *Glycosmis pentaphylla*, a most protean and difficult species,—in respect to leaves only, varying from a simple (1-foliolate) form—the lamina 10–12 inches long by 2–4 inches broad—to pinnate (3–5 leaflets), each lamina 2–3 inches by ¾–1 inch. The number of loculaments in the ovary, though clearly normally

* It is noteworthy that it has not yet, as far as I am aware, been found there.

symmetrical (5) occurs 4 or 3. The disk in one race is as a thickening of the base of the ovary with which it is entirely accrete; in another as a thickening, as it were, of the extremely short gynophore, separated by a more or less marked constriction from the ovary.

In the case of the two plants here spoken of, I have united under one species those forms which I felt myself unable intelligibly to define separately for systematic purposes*. In this course I conceive a second advantage to accrue in the comprehensiveness of view which it is adapted to lead one to take in respect not only to the geographical relations, but, if I may so say, the history of the species into which it affords perhaps some small measure of insight. Partly in deference to the course followed by more experienced botanists, I have not thus combined a plant found at the Cape—the only South Continental African member of the order—with one of the western peninsula of India, with which it entirely agrees, excepting that usually the foliage is smaller and the ovules more nearly, indeed almost truly, collateral. I speak of *Clausena inæqualis*, Bth., and the Indian *C. Willdenovii* (including *C. nana*). On this latter account—the tendency to have the ovules collateral —a special "genus" has been framed for the reception of the Cape plant.

I have united with *C. inæqualis* specimens from Cape Coast, gathered by Vogel (the *C. anisata* of Fl. Nigrit.); a more paniculate plant, of which I have seen several specimens in the Hookerian and British Museum herbaria, prevails in West Africa, which I think the true *Amyris anisata*, Willd. It is possible Vogel's plant may be a reduced state of this; it however closely resembles the Cape plant.

Notwithstanding the number of specimens which I have had through my hands, either dried, or in the fresh state from the Royal Gardens, I acknowledge that two or three of the genera I leave in a very unsatisfactory condition. Nor do I see how, under present circumstances, I can safely do otherwise. Indeed, until the species of the Eastern and Southern Indian Archipelago and of North Australia have been more fully collected and collated,

* It is sometimes alleged, that to treat any forms technically as varieties or as of subordinate rank to the species, is tantamount practically to totally disregarding them; and there may be, I admit, some truth in this; yet why should it be so? Many forms which have been raised to the rank of species, much to the encumberment of science, might well have been left disregarded, were that the only alternative.

it would be useless to attempt more. The genera which I feel to be thus opprobrious are *Limonia* and *Triphasia*. *Limonia* includes, of Indian species, *L. acidissima* and *L. alata*. These plants differ very considerably in habit as well as in floral characters, as stated below. Roemer placed the former plant in his genus *Hesperethusa*, and had it not been the original Linnean *Limonia*, I should have been disposed to allow it there to stay; but as, if one of the species be separated from *Limonia*, *L. acidissima* must remain, I have not ventured to separate *L. alata*, failing any plant in the herbaria which I have examined more clearly congeneric with it. As to *Triphasia*, *T. trifoliata* appears worthy of generic distinction, but *T. monophylla*, DC., I consider a trimerous *Atalantia*, and *T. glauca*, Ldl., an Australian plant, awaits further collectings before it can be permanently settled. It is but doubtfully a congener of *T. trifoliata*.

The structure of the flowers in *Aurantiaceæ* offers hardly any remarkable or anomalous feature. They are all regular and usually symmetrical; the ovary, however, frequently independent, in this regard, of the outer whorls. In *Piplostylis* (now merged in *Clausena*), a 3-celled ovary appears the prevalent condition (it varies with 4, 5, or even 2) with outer whorls normally pentamerous. With the exception of cohesion of filaments in two genera noted above, and the usually more or less gamosepalous calyx, either cohesion or adhesion in the three outer whorls is exceptional. I find in *Atalantia monophylla* a tendency in the petals to adhere slightly to the base of the staminal tube: this is the only case of notable adhesion that I have remarked. The sepals exhibit all grades of cohesion, and vary from rotundate or ovate broadly imbricating segments, separate to the base in *Glycosmis*, to the cupulate or urceolate, often almost entire calyx, of some species of *Citrus*, *Paramignya*, *Luvunga*, &c. In some forms of *Murraya exotica* the calyx lobes are proportionally narrower than in the rest of the order, and must be almost or quite valvate in æstivation. The petals, normally 3, 4, or 5 in number, glandular, firm, and mostly fleshy (least so in *Clausena*, which is rather characterized by thinner petals), are free; in æstivation usually imbricate, though in some *Micromelums* they become quite valvate, with often a trace of obliquity at the margins; in *Clausena*, though clearly imbricate, they are usually not so much so as in the order at large. In a *Paramignya* of Griffith's from Malacca, I find, in respect to æstivation, a very unusual condition. The corolla here appears truly valvate, indeed almost a little induplicate-valvate

above, while in three at least of the four remaining species the petals are greatly imbricate. This may be an exceptional state of the one gathering which I have seen, which affords very few buds to examine; if constant, it could not be regarded as of higher than specific importance, so closely is this species allied to the rest of the genus. For the present I regard this plant as a variety of *P. citrifolia*. The stamens when definite are clearly normally symmetrical with the calyx and corolla, almost invariably, exclusive of *Citrus* and *Ægle*, being the double number of the petals*.

In *Micromelum*, *Glycosmis*, *Clausena*, *Murraya*, the filaments are always alternately shorter, the longer filaments alternating with the petals. In *Atalantia* this alternation in length is more or less apparent, while in the remaining genera the stamens are nearly or quite equal at flowering.

The ovarium, in some genera sessile, resting in or surrounded at the base by a fleshy, free, or accrete, often cupulate disk, in others is very shortly but distinctly stipitate, especially in *Paramignya* and *Clausena*; in some species of which latter genus the short gynophore is considerably narrower than the ovary; yet the base of the latter is apparently encircled by a connate "disk," which in species with a pilose ovary is conspicuous, owing to its usually remaining nearly smooth. The contorted dissepiments of the ovary in one or two species of *Micromelum*, after or indeed at the time of flowering, form a curious feature to which I cannot recollect a precise parallel† (*vide infra*, p. 19). The style varies in length, but we do not find the stigma truly sessile in any *Aurantiaceæ*, unless we include the American genus *Casimaroa*. Often considerably elongated and conspicuously narrower than the ovary, which it may exceed in length, as in *Murraya*, *Citrus*, *Paramignya*, in other genera it is much shorter; in *Clausena* either long or short, while in *Glycosmis* we find the extreme in its reduction; the entire pistil being in one or two species shortly conical or almost cylindrical. The passage of the ovary into the style is in certain genera very gradual, in others very abrupt, the base of the style being also sometimes slightly constricted. There may be in a few species a true articulation at their union. In nearly, if not quite, all of the species, with the exception of *Glycosmis*, the style after flowering separates at or towards the base, either irre-

* *Limonia oligandra*, Dalz., 'Journ. Bot. and Kew Misc.' ii. 258, is a species of *Toddalia*.

† I think in a young berry of *Clausena Wallichii* I have observed a similar twisting.

gularly, or leaving a clean horizontal scar. In one species, *Atalantia monophylla*, this indurated scar or pseudostigma has been mistaken for a stigma, and a species accordingly founded on it (*A. platystigma*, R. W.). With regard to the style and ovary, though the relative proportional lengths vary considerably through the order, the species of each of the more natural genera are tolerably uniform.

The fruits of the various species offer marked contrasts; with the familiar *Hesperidium* we find but little in common either in the succulent 1- or 2-seeded berry of *Glycosmis*, or in that, often almost dry, of *Clausena* and *Micromelum*. None of the fruits of the *Aurantiaceæ*, that I am aware of, dehisce; and in this we find one distinguishing mark from a prevalent character of the allied *Xanthoxylaceæ*. The seeds usually present a pair of equal, fleshy, more or less planoconvex, oval or oblong cotyledons, unless mutual pressure, or a plurality of embryos, alter their form, as is frequently the case. The most remarkable difference from the typical structure is in the embryo of *Micromelum*; the *cotyledons* (in *M. pubescens*) being foliaceous, broad, almost or quite reniform or cordate, and contortuplicate, with a conspicuous radicle.

The inflorescence in *Aurantiaceæ*, upon the whole, I regard as essentially determinate and cymose, as is generally manifest in the multifoliolate genera (e. g. *Glycosmis*, *Micromelum*); in some species of *Atalantia*, and in *Citrus**, this determinate character is less obvious, though I think it still obtains†.

Upon the geographical distribution of the *Aurantiaceæ* I have not much to observe. The genera and species greatly preponderate in India, the Malayan Peninsula and Archipelago, four or five genera extending north to China and Japan; four or five differing widely from each other, representing at least two (perhaps each) of the three sections of the order usually adopted, reach Australia—viz. *Citrus australasica*, Planch‡, *Triphasia glauca*, *Glycosmis arborea*, var. and *Micromelum pubescens*, var. and one or two undetermined species. Ten genera, containing fifteen or sixteen species,

* Conf. Payer, Organ. Végét. p. 113.

† A. DeCandolle, in a valuable memoir upon the *Begoniaceæ* (Ann. Sc. Nat. Ser. iv. Bot. vol. xi. p. 100), intimates his opinion that axillary cymose inflorescences are infrequent associated with truly alternate leaves.

‡ This differs from typical species of *Citrus* in its free stamens. Specimens in fruit, closely resembling *C. australis*, are in Sir W. Hooker's herbarium from Cunningham, under the name of *Limonia australis*; though Cunningham's memorandum states the only flower he could find was decandrous and the stamens free; it may be possibly an *Atalantia* allied to *A. missionis*.

are found in Ceylon. I have not seen any Madagascar specimens, although species are described from thence. In South Africa is one species; in West Africa perhaps two, *Clausena anisata* and *Glycosmis africana*. The specimen of the latter plant is so very bad that I cannot tell whether it be truly a *Glycosmis*; no flowers have been described. Northwards from Cochin China the unifoliate, shining-leaved, shrubby forms prevail; while in India and the Archipelago several of the unifoliolate species are more or less scandent, and, with some pinnate-leaved species, pubescent or shortly pilose. In Continental India, Malacca, and Ceylon, and the islands of the Indian Ocean, there are twelve genera. Of these at least nine occur also in the Archipelago and Australia. I cannot give a precise estimate of the Archipelago species. In the islands no marked type is presented, so far as I am aware, differing from those of the main land. *Triphasia glauca* of Australia is, perhaps, the most distinct in this respect.

Unless *Papeda* of Hasskarl be generically distinct, we have no generic type in the Archipelago unrepresented in continental India, where the order evidently finds its focus. No single species has a remarkably wide range, with the exception of the two to which I have alluded (p. 6). *Atalantia buxifolia* I believe to be an Eastern Asiatic species only, and not a Coromandel plant, as stated in Roxburgh's 'Flora Indica*.' I have seen specimens from Macao, Hongkong, and Formosa. It is a species in cultivation at Kew, and is the *Limonia bilocularis* of Roxburgh, *Severinia* of Tenore, and *Sclerostylis buxifolia* of Mr. Bentham.

There are two genera frequently associated with *Aurantiaceæ* which I have not included in this review, though I am by no means prepared to say that they can be appended to any other order with greater propriety than to this. These genera are *Casimaroa*, Ll. and Lex., and *Skimmia*, Thb. Of the former Central American species, I have examined flowering specimens contained in Sir W. Hooker's herbarium; the fruit I have not seen, but a tolerable figure of it is given in Seemann's 'Botany of the Herald,' (tab. lii.). It differs from all the species of *Aurantiaceæ* that I have examined in its uniseriate stamens (same in number with the petals), and sessile, 5-lobed, discoid stigma. The seeds are described as exalbuminous. From the drawing, the succulent tissue forming the mass of the fruit would seem to be derived from the mesocarp. This in itself, however, is comparatively unimportant,

* Vol. ii. p. 377, *vide infra*, p. 26.

so far as its relations are concerned. Viewed in the light of Mr. Darwin's theory, the idea presents itself that the claim which *Casimaroa* may possess to be grouped with the *Aurantiaceæ* is due less to inheritance by direct descent with the other species than to divergence in the direction of this order from some allied but comparatively remote type (perhaps *Xanthoxylaceæ*); which in its turn, however, may be admitted to have sprung, with the *Aurantiaceæ*, from one common parent stock; and this view would seem to be supported by the nature of the differences which separate *Casimaroa* from truly Aurantiaceous genera, as well as by the fact that none of the latter are native (so far as is shown) in the New World.

With regard to *Skimmia*, I shall not at present enter upon the discussion of its best position in the natural system; whether it ought to be appended to *Aurantiaceæ* or to *Xanthoxylaceæ*. It differs from the former order in its albuminous seeds, uniseriate stamens and abortion (or tendency to abortion) of one sex in, at least, the Himalayan species. In other respects it is exceedingly Aurantiaceous in structure, especially agreeing in the form of the pistil and in the succulent fruit. One species, *S. japonica*, is not infrequent in cultivation.

ATALANTIA.

Founded by Correa de Serra, in the 'Ann. du Museum' (tom. vi. 1805), on *Limonia monophylla*, L. and Roxb. (Pl. Cor. ii. 83). After an extended examination and comparison of the species which have been referred by authors to this genus and to *Sclerostylis* (*v. infra*), I have been led so to modify the generic diagnosis of *Atalantia*, as to embrace nearly the whole of these in one natural group. Correa's original *Atalantia* was characterized by tetramerous flowers and monadelphous stamens. But the importance of the character derived from symmetry I find generally too subordinate in the order to attribute any great value to it *per se*; and in one or two species referred to *Sclerostylis* by Dr. Wight and others, the filaments are more or less irregularly united or monadelphous. The species which I unite with *Atalantia* agree with it in important features, and have all a similar habit, unifoliolate leaves, and axillary inflorescence, and taken together, they constitute a natural generic assemblage.

There are, however, one or two points in *A. monophylla*, besides those which I have bridged over, which are peculiar, and constitute it, with a very closely allied plant of Helfer's, as perhaps a

marked section of the genus. I have never, or very rarely indeed, found the calyx of *A. monophylla* perfect. I have seen very many specimens of it in flower, but the flowers appear to open simultaneously, and I have hardly had the opportunity of examining a sufficient number of young buds to understand clearly its original form. At the time of flowering it is invariably irregularly split, and its margin scarious and eroded. The ovary is 4-, very rarely 5-locular. In other *Atalantias* the calyx is perfect at flowering, as in all other species of the order, and usually 4- or 5-lobed or partite; the ovary being, in the species nearest to *A. monophylla*, usually bilocular. *A. Hindsii*, as observed *supra*, is a rather anomalous member of the genus. It is not improbable that further discoveries in Eastern Temperate Asia may lead to its union with other forms partaking more fully than *Atalantia* of the characters of *Citrus*.

SCLEROSTYLIS.

Blume published this genus in his 'Bijdragen' in 1825. I have not seen authentic specimens of any of the five species which he describes; but from an examination of his descriptions, and my acquaintance with Javanese species of *Aurantiaceæ*, I feel satisfied his plants may be referred, part to the genus *Atalantia*, part to *Glycosmis*. Of his *S.* (?) *macrophylla*, he says himself, "*An Glycosmis pentaphylla*?" If it should appear needful to separate from *Atalantia* the species which retain a perfect calyx at the time of flowering, the diagnosis of *Sclerostylis* might be, I think, suitably modified for their reception. The species referred by Dr. Wight to *Sclerostylis* I include under *Atalantia*. Miquel divides the genus between *Limonia* and *Glycosmis*, following Sprengel (Syst. Veget. iv. 161).

TRIPHASIA.

This genus, proposed by Loureiro in his 'Flora Cochin Chinensis,' was based on a species previously described in Linnæus' 'Mantissa' (1771) as a species of *Limonia* (*L. trifoliata*). *Triphasia trifoliata* is probably entitled to generic distinction, although I believe the ternary symmetry of its flowers alone would by no means suffice to base the genus exclusively upon. It sometimes occurs with tetramerous flowers, though rarely; the ovary and berry are also occasionally 4-locular, and the leaves 1-foliolate. It is difficult to say to which genus *Triphasia* is most nearly allied,—probably to *Limonia*. *T. monophylla*, from Timor, is a trimerous

Atalantia, as DeCandolle himself observed, differing solely from the other species of this latter genus in its ternary outer whorls. I have not had good specimens to examine myself, but M. Decaisne states the ovary to be bilocular, as it is in several *Atalantias*. *T. glauca*, an Australian shrub described by Dr. Lindley in Mitchell's 'Tropical Australia' (p. 353), is a doubtful congener of *T. trifoliata*. For the present I leave it in the genus. Before determining where finally to dispose it, the examination of more numerous flowers is desirable. I have thought that perhaps it might be associated with *Atalantia (Limonia) missionis*, an Indian species, rather isolated in its general *facies* as well as by precise characters. *T. sarmentosa*, Bl., is quite unknown to me, excepting from the description. Wight and Arnott think it probably not a *Triphasia*. I have not re-written the generic description of *Triphasia* for this paper.

LIMONIA.

The solitary *Limonia* originally described by Linnæus in the 'Species Plantarum' (ed. 2), is a very distinct plant, Xanthoxyleous in its general features, but with the flowers and fruit of a true *Aurantiacea*. The figure of it in Rheede's 'Hort. Malab.' (iv. 14), quoted by Linnæus, is very characteristic; as to Rumpf's figure, also quoted by him, I am not clear if it belong to the same species. This genus has been most unmercifully hampered by very diverse species which have been allotted to it, especially by the older botanists. Of the eleven species described in the 'Prodromus' (three as doubtful *Limonias*), 1 is a *Murraya*?, 1 *Skimmia*, 2 *Glycosmis*, 1 *Triphasia*, 1 *Micromelum*, while 3 are referable to *L. acidissima*. The remaining 2 may also be *Limonias*: they are described by Lamarck from Madagascar and Mauritius specimens, and would seem to be allied to *L. alata*. I have not re-written the description of the genus, as I do not feel that the material to which I have had access would enable me to offer a satisfactory one; especially failing Lamarck's plants, and seeing, further, that the two species which I still retain in *Limonia* differ from each other considerably in habit and some floral characters. It has occurred to me that *L. alata* may be related to *Luvunga* more nearly than has been suspected. I find the geminate ovules of this species to be sometimes both obliquely superimposed and collateral in cells of the same ovary. *Limonia missionis* I have removed to *Atalantia*, with the species of which it appears to me to have closer affinity than with *Limonia* proper.

Murraya (including *Bergera*).

To this genus has been ascribed a 2-celled ovary, with geminate, superimposed ovules in each cell; to *Bergera* also a 2-celled ovary, but solitary ovules. Messrs. Dalzell * and Thwaites† observe, however, as I have also found, that *Bergera* occurs sometimes with geminate ovules. Mr. Dalzell states that when there are two ovules in a cell, he finds them to be collateral. In the specimens which I have examined, I find them either obliquely superimposed, or very nearly quite collateral; thus indicating an approach to *Murraya*. Mr. Thwaites sends from Ceylon a *Murraya*, under the MS. name of *M. Glenicii*, precisely resembling *M. exotica*, but with 5 or 4 loculaments to the ovary. And, again, specimens of an *Aurantiacea* collected in the Philippines, referred by Turczaninow to *Glycosmis*, though with very decidedly the *facies* of a *Murraya*, present 5-locular ovaries with the ovules sometimes solitary, sometimes geminate, and in the latter case either obliquely superimposed or quite collateral. As in all other respects, apart from the ovarium and its contents, *Murraya* and *Bergera* closely approach each other, I have, in consideration of the facts above noted, concluded to follow Sprengel ‡ in combining the two genera. They agree well in inflorescence, in the linear-subulate filaments bearing small rotundate anthers, the rather long style—at first continuous with the ovary, at length caducous at a little above its base—and probably also in the disk bearing the scars of the fallen whorls, which after flowering grows out in one or two species so as to fill the calyx. In *Bergera* the leaves are usually slightly pubescent, at least on the rachis and midribs, and they are less coriaceous than in *Murraya*; the testa of the seeds, also, is glabrous in the former, but these of themselves are comparatively trivial exceptions. In the biovulate *M. exotica*, I find the ovules to originate at the same, or very nearly the same, level on the placenta; one of these becomes eventually pendulous and shortly funiculate, while the other, and superior, is more or less peltate.

Piplostylis.

Founded by Mr. Dalzell, in the 'Kew Miscellany' (vol. iii. 33), upon a species met with in Bombay. The same plant (*P. indica*) has been also sent from Ceylon by Colonel Walker, Dr. Gardner,

* Kew Journ. Bot. iii. p. 34. † En. Pl. Zeyl. p. 46.

‡ Syst. Veget. ii. p. 315. M. DeCandolle, in Prod. i. 537, under *Bergera*, says "An a *Murraya* satis differt?"

and Mr. Thwaites. Mr. Thwaites, in 'Enumeratio Pl. Zeylaniæ' (p. 46), describes it as a new species of *Bergera* (*B. nitida*), pointing out, and unwittingly emphaticizing at the same time, its near affinity with *Piplostylis indica,* known to him through Mr. Dalzell's description. Owing to this description having been based upon the examination of specimens from probably but one tract of country, it is a little too narrowly circumscribed; hence, in the absence of authentic examples, Mr. Thwaites' inability to identify the plants. Mr. Dalzell described the ovary as trilocular, Mr. Thwaites found it, in the Ceylon plant, bilocular. From the examination of specimens both from the mainland and from Ceylon, very closely according in every other character, I find the ovary varying with 3, 4, or 5 cells, commonly, however, with 3. I think the 2-celled ovary must be generally unusual. Of the identity of Mr. Thwaites' plant with that from Bombay I have no doubt.

It was my intention, as stated when I read the introductory portion of this paper before the Linnean Society, to retain the genus *Piplostylis*—for the present, at least—as distinct. Upon further consideration, however, especially in connexion with a species which I had not examined minutely at that time, I feel satisfied that the proper course is to unite it with *Clausena.* I find that this plant (*C. Wallichii*) does not permit me a single excuse for maintaining it generically distinct: the relative position of the ovules, and the carpellary symmetry pointed out by Mr. Dalzell, both fail. *C. Wallichii* is another of those species in which the ovules are found either superimposed or collateral. Generally in 5-celled ovaries they appear to be superimposed; when the cells are reduced to 4, as sometimes happens, we find, in at least one cell, that the ovules are collateral. The inflorescence, small flowers, and short distinct style present quite the characters of *Clausena* (*Piplostylis*) *indica*; approaching, also, *Murraya* (*Bergera*) *Königii*. *C. indica*, and the Javanese species described below (which, had the genus been maintained, would have been associated with it), offer, in the peculiar mode of branching of the inflorescence, and its rounded corymb-like or pyramidal form, a *facies* which it is not easy to express, dependent chiefly upon the straight secondary branches, undivided towards the base. Mr. Dalzell's figure, accompanying his notice, is well executed, and gives a very fair idea of it.

Clausena (including *Cookia*).

To this genus, established by Burmann in his 'Flora Indica,' Wight and Arnott have correctly referred several Indian species, described by Roxburgh under the genus *Amyris*. The typical *Clausenæ* are characterized by pinnate, often more or less hairy leaves, tetramerous flowers disposed in cymose clusters in paniculate or racemose, terminal or axillary inflorescences, and 1- or 2-seeded berries. A few species vary with pentamerous flowers. As I consider the usually pentamerous symmetry and succulent, often 5-seeded berries of the genus *Cookia* of Sonnerat, to be in themselves insufficient to constitute valid grounds of generic distinction, I have united it, as a section, with *Clausena*. With this genus, as hitherto maintained, it agrees entirely in other respects, and especially with those species having a terminal, much-branched inflorescence. The arching concavity of the filaments is perhaps not so marked in *Cookia* as in *Clausena*. My grounds for including *Piplostylis* in *Clausena* I have stated above.

The genus *Aulacium* of Loureiro, referred to *Cookia* by DeCandolle (Prod. i. 537), must be a dubious associate of this group. I understand the leaves, from Loureiro's description, to be simple; I have not seen anything like the 4-sulcate petals which he ascribes to his genus.

Glycosmis.

Based by Correa de Serra on two species referred by Retzius and Dr. Roxburgh to the genus *Limonia*, and figured by the latter in his 'Plants of Coromandel,' vol. i. tt. 84, 85. The genus *Glycosmis* I consider a natural one. It is mainly characterized by small flowers with pentamerous outer whorls, the calyx 5-partite, with broadly imbricate lobes, the very short and thick persistent style directly continuous with the ovary and sometimes of almost equal diameter, the cells of the ovary usually 5 or 3 (though sometimes it is found with 4 or 2), each cell containing a solitary ovule. The leaves consist usually of several, but not numerous, leaflets, which are glabrous and more or less coriaceous in texture. The axillary cymose inflorescence is commonly small. In one or two forms we may find 1-, 3-, or 5-foliolate leaves on the same branch. Some varieties of *G. pentaphylla* are particularly variable in this respect; in one of these, growing in Khasia and Assam, the leaflets, when solitary, are often unusually large, sometimes 10 inches in length. *Glycosmis pentaphylla*, as I have endeavoured to

circumscribe it, as nearly in conformity with what has appeared to me to be the present condition of the species in nature as I could, offers, as already observed (p. 6), a very interesting study. It is a remarkably variable plant, varying especially in the number of leaflets, their size and form, the size of the flowers, the disk, and its relation to the ovary, and also the number of cells in the ovary. There are at least two principal races of this species, which are generally to be easily recognised at sight. One of these has the axillary cymose panicles often clustered towards the extremity of the branches, forming a dense mass of inflorescence exceptional in the genus; the flowers rather larger; the pistil frequently mammillate, owing to prominent immersed glands; and the disk, accrete with the base of the ovary. In a second race, the flowers are very small; the inflorescences, although of numerous flowers, much reduced in size, falling usually very considerably short of the leaves; the pistil but slightly glandular, mammillate or smooth, and separated by a slight constriction from the disk, which is sometimes very small and connate with the very short gynophore.

I should perhaps be disposed to hold these races as specifically distinct, were they not so closely united through the more Eastern variety from China and the Philippines, as well as by varying forms growing in the Peninsulas. I do not find, as in the case of *Micromelum*, that the chief races are conspicuously confined to special areas, further than that the larger-flowered race described above seems chiefly limited to the western portion of the area of the species. The Chinese and Archipelago variety (*G. citrifolia*, Ldl.) presents much of the *facies* of the first-mentioned race, with the structure of disk and pistil of the second.

Micromelum.

Established by Blume, in his 'Bijdragen,' in 1825. He published but one species, *M. pubescens*. Though I have not seen authentic examples, I have no hesitation in recognising his plant in Javanese specimens collected by Spanoghe, Lobb and Zollinger, as well as in numerous examples from other countries. Curiously enough, Hasskarl * refers *Micromelum* to *Cookia punc-*

* Plantæ Javanicæ Rariores, p. 280. Of *Cookia*, he says "Semina unum alterumve evolutum, reliqua abortiva, et inde fructus dissepimenta intorta;" and again, in 'Cat. Hort. Bogor.' alter, p. 215, in foot-note to *Micromelum* (quoted as a synonym of *Cookia*), "Calyx parvus, urceolatus, 5-fidus (nec inte-

tata, and he is followed by Professor Miquel (Flor. Ind. Bat.). I cannot doubt but that neither of these botanists is acquainted with the true plant. The essential characters of the genus rest especially in the broad, foliaceous, and remarkably contortuplicate cotyledons; perhaps, also, in the singular torsion of the dissepiments of the ovary, which, in *M. pubescens*, is usually apparent immediately after the fall of the floral whorls. How is this condition brought about? Is it due to a torsion of the axis of the ovarium? I have not ascertained whether its direction be constant; this ought to be studied upon the living plant. The fruit is but 1- (or 2-)seeded, and the twisted dissepiments with the empty loculaments are soon closely pressed to one side by the young seed. The style is minutely constricted or articulated at the base to the ovary. In *M. pubescens* the ovary is very usually 5-locular; in Ceylon and Java specimens I have found an exceptional 6th cell; in the Australian plant from Port Essington, &c., it varies, 4, 5 or 3. *M. molle*, Turcz., I have found to be 4-locular, but probably it also varies.

The peculiar features which I have remarked of the ovary and seed are associated with other common characters, which render the genus a tolerably natural one. These are especially the truly valvate or obliquely valvate æstivation of the corolla, and the terminal cymose corymbs of numerous flowers,—as in *Murraya* seldom or never having the central axis of inflorescence elongated as it is in the paniculate *Clausenæ* (including *Cookia*), and, in less degree, in *Piplostylis*. I am acquainted with but three species of *Micromelum*. From the previous observations upon *M. pubescens*, it will be apparent, however, that were the minor differences which I have alluded to regarded as of specific value, we might at least double the number of species in the genus. On this extreme view, the (1) Australian, (2) Polynesian, (3) Archipelago, Malay and Ceylon, and (4) the Sikkim and Assam forms, or varieties as I have held them, would be separated. We find the *Micromelum*, in continental Asia, confined to tracts bordering on the high lands of the Himalaya, and along the continuation of the chain, through Birma and the Malay Peninsula. May we suppose that, at a

gerrimus!). In cæteris characterem *Cookiæ* . . . quadrans genus, floribus quinariis. Dissepimenta baccarum . . . seminibus reliquis abortivis, uno alterove evoluta intorta." I have examined both barren and 5-seeded fruits of *Cookia*, preserved in fluid in the Kew Museum, and find nothing resembling the spiral torsion of the dissepiments of *Micromelum*. Besides, the structure of the seeds is totally different.

period when the species was able to migrate to the Archipelago and Australia, physical conditions obtained which prevented its extension to the tract now forming the Western Peninsula?

PARAMIGNYA.

It is not improbable that further investigation may lead to the union of this genus with *Luvunga*. Dr. Wight, in his observations on the distinctive features of *Paramignya**, states it to be removed from that genus by the symmetry of the carpels and outer whorls, its usually pentamerous flowers, free filaments, and especially by "the distinct endocarp of the fruit." With regard to the number of carpels constituting the pistil, I find the only species of *Paramignya* described by Dr. Wight to vary with 3, 4, or 5. A second species (the *Arthromischus* of Mr. Thwaites) has a trilocular or sometimes a quadrilocular ovary: the other true *Paramignyas* are quinquelocular. On the other hand, *Luvunga scandens* varies with 4 to 2 cells, though usually it is trilocular. Again, the outer whorls of the flower in a *Luvunga* from Borneo are pentamerous, the stamens are free, as they are also in *L. eleutherandra* of Mr. Dalzell. I do not see any important difference between the fruits of the two genera. These main points, then, of distinction between *Paramignya* and *Luvunga* fail, and the species of *Paramignya* described by Hasskarl †, varying with 1, 2, or 3 leaflets, would seem to unite yet more intimately the always unifoliolate *Paramignyæ* with the trifoliolate *Luvungæ*. I have not, however, seen this species, and until we possess further suites of specimens from the Archipelago, the safer course is, I think, notwithstanding their intimate relationship, to retain the genera distinct.

Mr. Thwaites proposed the genus *Arthromischus* in his 'Enum. Plant. Zeylaniæ,' p. 47. He considered it to differ from *Paramignya* in its jointed leaf-stalk, small calyx, and uni-ovulate cells of the ovary. An articulation in the petiole I find, however, more or less distinctly in *P. citrifolia* and *P. grandiflora*; and *P. monophylla* has sometimes, and *P. grandiflora* nearly always, one ovule in each cell.

The ovary in *P.* (*Arthromischus*) *armatus* is usually 3-locular, and not, I think, 4-locular, as described in the 'Enumeratio.' I am unable to find any sum of characters or single character at all

* Illust. Ind. Bot. i. 108.

† Cat. Hort. Bogon. alter, p. 216.

sufficing to retain *Arthromischus* of generic rank. I have therefore united it with *Paramignya*, to one or two species of which it is very closely related in every respect.

Luvunga.

Excepting the large trifoliolate leaves, and the inflorescences generally in abbreviated cymose racemes or panicles, there is but little difference between this genus and the foregoing. Further material may enable us to decide more satisfactorily than at present is possible, whether they should be kept separate or united. *L. eleutherandra*, Dalz., from the Western Peninsula and Ceylon, is perhaps doubtfully distinct from *L. scandens*. From the irregularity in the amount of cohesion between the filaments of the latter species, I cannot regard the free stamens of Mr. Dalzell's plant as affording, *per se*, a specific character, especially that in Ceylon we find free stamens associated with the narrow leaflets characteristic of *L. scandens*. There are probably two or three species of *Luvunga* in Borneo, judging from the imperfect specimens which I have seen.

Feronia.

I am only acquainted with the species originally described in the Society's Transactions (vol. v. p. 224) by Correa de Serra,—*F. elephantum*. In dissecting the ovary at the time of flowering, or just before, the placentas are found to separate very easily, presenting the appearance of a unilocular ovary. This slight degree of axial adhesion of the placentary partitions at so late a stage in the development of the pistil is unusual, and I do not remember to have noticed it in any of the genera which I have examined in detail. I am not sure but that, either above or below, the ovary may be unilocular at the time of flowering*.

Ægle.

I have nothing to add to the published accounts of this well-known plant, the *Bael* of India. Blume describes one species in his 'Bijdragen,' as cultivated in Java under the name of *Æ. sepiania*. So far as I can judge from his description, I agree with Messrs. Wight and Arnott in considering it doubtfully distinct from *Æ. marmelos*. Blume does not mention this latter name.

* Roxburgh (Fl. Ind. ii. 412) says, "the germ is 1-celled, containing numerous ovula attached to 5 parietal receptacles."

GENERA AURANTIACEARUM.

§ 1. *Ovula* solitaria v. gemina.

* Stylus *brevissimus, persistens* (ovula *solitaria*).

6. GLYCOSMIS. *Calyx* 5-partitus; lobis latis, marginibus imbricatis. *Stamina* 10, libera, alterna breviora; antheris ovatis v. ovato-oblongis.—Ramuli inermes. *Folia* 1–3-5–7-foliolata.

** Stylus *denique sejungens.*

† Embryonis (in sp. Ind.) *cotyledones* foliaceæ, contortuplicatæ.

7. MICROMELUM. *Calyx* 5-lobulatus v. integer. *Petala* æstivatione valvata v. subvalvata. *Stamina* 10, libera; ovula geminata, superimposita.—Inermes. *Folia* pinnata. *Inflorescentia* in cymis corymbosis terminalibus.

†† Embryonis *cotyledones* carnosæ plus minus planoconvexæ.

a Folia *pinnata v. 3-foliolata.*

2. TRIPHASIA (sp. in Ind. cult.). *Calyx* 3-lobatus. *Stamina* 6, libera. *Ovula* solitaria.—Spinosa. *Folia* 3-foliolata. *Flores* sæpius solitarii, axillares.

3. LIMONIA. *Calyx* 4- v. 5-lobatus v. partitus. *Stamina* 8 v. 10, libera. *Ovarium* 4- v. 5-loculare. *Ovula* solitaria v. geminata, collateralia v. oblique superimposita.—Spinosa. *Folia* jugatim pinnata v. 3-foliolata.

4. MURRAYA. *Calyx* 5-fidus v. partitus. *Petala* obovato-lanceolata v. oblonga. *Stamina* 10, libera; filamentis lineari-subulatis; antheris parvis ellipticis v. rotundatis. *Ovula* solitaria v. gemina, superimposita v. fere collateralia. *Stylus* longiusculus.—Inermes. *Folia* pinnata. *Inflorescentia* terminalis sæpius cymosa multiflora.

5. CLAUSENA. *Calyx* 4- v. 5-lobatus v. partitus. *Stamina* 8 v. 10, libera; filamentis infra dilatatis; antheris ovatis rotundatisve. *Ovula* geminata, superimposita v. collateralia.—Inermes. *Folia* pinnata. *Inflorescentia* paniculata v. racemosa.

9. LUVUNGA. *Calyx* cupulatus. *Petala* 4–5 oblonga. *Stamina* 8 v. 10, libera v. filamentis in tubum coalitis; antheris linearibus v. lineari-oblongis. *Ovarium* 3–4 (2) -loculare, ovulis geminatis superimpositis.

b. Folia 1-*foliolata.*

8. Paramignya. *Calyx* 5 (v. 4) -lobulatus v. lobatus. *Stamina* 10, (v. 8) libera; antheris lineari-oblongis. *Ovarium* in toro elevato æquicrasso impositum. *Ovula* solitaria v. geminata oblique superimposita.

1. Atalantia. 4–5 (in spp. Ind.) -lobatus v. partitus, v. irregulariter (temp. florifero) fissus. *Stamina* 8 v. 10, libera v. filamentis in tubum coalitis; antheris ovatis v. cordato-oblongis. *Ovarium* sæpius 2–4-loculare, ovulis solitariis v. geminatis, collateralibus.

§ 2. *Ovula* in loculis plurima.

a. Folia *unifoliolata* (in spp. Ind.).

12. Citrus. *Calyx* cupulatus v. partitus. *Stamina* 20–60, filamentis sæpius plus minus coalitis. *Ovarium* multiloculare.

b. Folia *pinnata v. trifoliolata.*

10. Feronia. *Calyx* 5 (v. 6) -lobatus. *Stamina* 10 (v. 12), libera v. basi vix coalita, æqualia. *Ovarium* 5 (v. 6) -loculare v. quasi 1-loculare.

11. Ægle. *Calyx* 4–5-lobulatus. *Stamina* 30–60, plerumque libera v. filamentis plus minus coalitis. *Ovarium* 8-multiloculare.

SYNOPSIS OF INDIAN AURANTIACEÆ, WITH A FEW NEW OR IMPERFECTLY DESCRIBED EXTRA-INDIAN SPECIES.

1. Atalantia, *Correa de Serra, Ann. du Museum,* tom. vi. 383.

Char. emend.—*Calyx* 4–5 (in *A. trimera,* 3) -lobatus vel partitus (in *A. monophylla* tempore florifero irregulariter fissus). *Petala* 4–5 (v. 3), libera (in *A. monophylla* ad tubum stam. basi sæpe adnata). *Stamina* 8 v. 10 (in *A. trimera* 6, in *A. Hindsii* circa 15), libera aut in tubum v. irregulariter coalita, subæqualia v. alterna breviora, antheris ovatis, ovato-cordatis v. oblongis. *Discus* sæpe annulatus cupulatusve, ovarii basin cingens. *Ovarium* 2–4 (rar. 3 v. 5) -loculare; ovulis pendulis subpeltatisve geminatis, collateralibus v. solitariis. *Bacca* gloglobosa, 1–5-locularis, 1–5-sperma. *Embryonis* cotyledones carnosæ v. amygdalinæ, planoconvexæ. *Frutices* vel *arbusculæ* spinosi v. inermes. *Folia* simplicia (unifoliolata). *Flores* in racemis aut fasciculis, vel rarius in paniculis parvis axillaribus cymosim dispositi, nonnunquam solitarii.

§ 1. *Calyx tempore florifero ad basin irregulariter fissus, margine scariosa plus minus erosa.* (*Stamina filamentis in tubum coalitis.*)

1. A. MONOPHYLLA, *Corr. l. c., DC. Prod.* i. 535. Ovario 4 (vel abortu 3, rar. 5) -loculari, ovulis solitariis v. geminatis.—*Wt. & Arn. Prod. Fl. Penins.* 91; *Wall. Cat.* 6353.

A. floribunda, *Wt. Ic.* iv. 1611.—A. platystigma, *Wt. Illust.* i. 108.—Limonia monophylla, *Linn. Mant.* alt. 237.—Turræa virens, *Hellen. Act. Holm.* 1788, tab. 10, fig. 1.—Trichilia spinosa, *Wild. Sp. Pl.* ii. 554; *DC. Prod.* i. 623.

α. Ovulis sæpissime solitariis.

β. (*macrophylla*) ovulis geminatis (foliis ovato-ellipticis sæpius 2–4 unc. long. 1½–2½ unc. lat.).

γ. (*carissoides*) foliis ovatis ovato-lanceolatisve, pedicellis pilosis longioribus.

Loc. Khasia (reg. trop.)! *J. D. H. & T. T.*; Madras! *Shuter*; Nilghiris! *Foulkes, Hb. Hk.*; Coimbatore, *Wight*; Ceylon! (6000 ft.), *Walker & Thwaites* (*C. P.* 1198), *Hb. Hook.*

Var. *β*, in *Hb. Helfer.*—*γ*, Segaen ripæ Irrawaddi! *Hb. Wallich.* 6354.

The stamens, normally 8, sometimes are but 5–7. When the ovary is trilocular, one cell contains a pair of ovules. The style, which is at first continuous with the ovary, after flowering abruptly separates towards the base, leaving a transverse indurated scar. The berries are 3 or 4-, or by abortion 1-seeded.

Var. *β. macrophylla* closely agrees with the common form, excepting in the characters indicated. The disk, however, is small and annulate.

§ 2. *Calyx* 4–5 *v.* 3-*lobatus. Stamina filamentis liberis aut in tubum v. irregulariter coalitis.*

* Flores trimeri.

[A. TRIMERA, calycis lobis triangulari-rotundatis, staminibus subæqualibus.

Triphasia monophylla, *DC.* i. 536; *Gaud. in Freyc. It. Bot.* 42. Decaisne, *Hb. Timor. Desc.* p. 111.

Loc. Timor! *ex Hb. Mus. Paris, Hb. Benth.*; Java! *Horsfield, Hb. Hook.*]

** Calyx normale 4-lobatus. Ovarium biloculare, ovulis geminatis.

2. A. RACEMOSA, *Wt. & Arn. Prod. Fl. Penins.* p. 91. Filamentis infra in tubum coalitis, *Wight. Illust.* i. 64.

Sclerostylis racemosa, *Wt. Illust.* i. 109.—S. parvifolia, *Wt. l. c.* 109. *et Icones* (sub. n. *S. atalantioides*) i. 71.—S. ovalifolia, *Wt. Illust.* 109.

Var. *floribus congestis—Atalantia capitellata,* Lindl. in *Wall. Cat.* 6355; *Lampetia,* Roem. Syn. fasc. i. 42.

Loc. Bombay! *Law* (Concan! *Dalzell*); Nilghiris! *Gardner*; Ceylon! *Walker & Thwaites* (*C. P.* 3673).

Some forms much resemble *A. monophylla* at first sight. Occasionally trimerous flowers are found. It is a variable plant, especially in the number

and density of the flowers in the axillary racemes. In some forms the filaments are united almost quite to the apex. I have found the ovary trilocular.

3. A. CEYLANICA. Filamentis liberis v. 2 v. 3 inter se plus minus coalitis, disco annulato subcupulato, foliis ovato-lanceolatis, oblongis vel ellipticis.

Rissoa ceylanica, *Arn. Pug. Pl. Ind. Or.* 6 (324).—Sclerostylis ceylanica, *Wt. Illust.* i. 109; *Thwaites En.* p. 46.—S. Arnottiana, *Wt., l. c.*

β. (*rotundifolia*) foliis rotundatis.—*Sclerostylis rotundifolia,* Thwaites, En. Pl. Ceyl. p. 46.

Loc. Ceylon! *Walker, Graham* (Galle, 107! *Gardner*), *Thwaites, C. P.* 1196 (? Nilghiris. *Hb. Hook*).—Var. β. Ceylon! (*C.P.* 3295) *Thwaites.*

4. A. ROXBURGHII. Filamentis liberis, foliis lanceolatis utrinque angustatis sæpius longiuscule acuminatis, apice abrupte retusis marginatisve.

Sclerostylis Roxburghii, *Wt. Icones,* i. 72.—Limonia? caudata, *Wall.*—Amyris simplicifolia, *Roxb. Fl. Ind.* ii. 244, tab. (*Mus. E. I. C.*) 2478.

Loc. Churra, Khasia! *J. D. H. & T. T.*; (*Hb. Calc.* 1837, in *Hb. Griffith*).

Differs from *A. ceylanica* in its narrower acuminate leaves. The ovary rests on a short stipitiform disk, which appears scarcely so broad as its base.

*** *Calyx* 4–5-lobatus. *Ovarium* sæpius 4 (rar. 5) -loculare, ovulis geminatis.

5. A. MISSIONIS. Floribus sæpius tetrameris.

Limonia missionis, *Wight in Hook. Bot. Misc.* iii. p. 291, tab. supp. xxxiii.—Limonia? missionis, *Wall. Cat.* 6358.

Loc. Red Hills, Madras! *G. Thomson in Hb. Hook*; Ceylon! *Thwaites* (*C. P.* 1194).

**** *Calyx* 5-lobatus v. partitus. *Ovarium* 2–3 (rar. 4) -loculare, ovulis solitariis.

a. Stamina 10.

[A. NITIDA. Sclerostylis nitida, *Turcz. in Mosc. Bull.* 1858. p. 249.

Ramuli teretes, incani. *Folia* ovalia v. ovali-lanceolata, vix acuminata, apice emarginata, integra v. obsolete crenulata, glabra, parallele et crebre venosa, $1\frac{1}{2}$–$2\frac{1}{2}$ unc., petiolo 1–2 lin. long. *Flores* in racemis cymosis, axillaribus, pauci-multifloris, $\frac{1}{2}$–2 unc. longis. *Calyx* 5-partitus; lobis rotundatis, obtusis v. subapiculatis, marginibus imbricatis, ciliatis. *Petala* 5, oblonga v. elliptica. *Stamina* 10, alterna breviora, libera v. interdum filamentis irregulariter plus minus coalitis. *Discus* cupulatus, basin ovarii arcte cingens. *Ovarium* 2–3 (rar. 4) -loculare; ovulis in loc. solitariis. *Stylus* distinctus. *Stigma* 2–3 (4) -lobulatum.

Var. β. *Flores* in racemis v. sæpius in paniculis strictis, cymosis, axillaribus, apices versus ramulorum.—*Sclerostylis atalantioides,* Wt. & A.? A. Gray, U. S. Expl. Exp. i. 234.

Loc. In ins. Philippinis! *Cuming, Hbb. Hook. et Benth.* Var. β. Philippines! *Cuming*, 991, *Hbb. Hook. & Benth.*; Mangsi Island, fide *A. Gray*.]

[A. BUXIFOLIA. *Flores* parvi, subsessiles, solitarii v. in *glomerulis* parvis, axillaribus. *Stamina* 10, libera. *Ovarium* 2 (var. 3) -loculare; ovulis solitariis v. rar. geminatis.

Atalantia? bilocularis, *Wall. Cat.* 6356.—Limonia bilocularis, *Roxb. Fl. Ind.* ii. 377; tab (*Mus. E. I. C.*) 2242.—Sclerostylis atalantioides, *Wt. & Arn. Prod. Fl. Penins.* 94 (non *Wt. Icones*).—S. buxifolia, *Benth. Kew. Misc.* iii. 326; *Seemann Voy. Herald*, 369, tab. 81.—Severinia buxifolia, *Tenore, Ind. Sem. Hort. Neap.* 1840.—Helie, *Roemer. Syn. Monog.* fasc. i. 42.

Loc. Hong Kong! *Champion, Wright*; Formosa! *Wilford*; Macao! *Millet*; China! *Millet, Hance*.]

Dr. Roxburgh in his 'Flora Indica' (ii. 377) states this plant to be a native of Coromandel. Messrs. Wight and Arnott also quote Coromandel on the authority of Dr. Berry, "who sent it in 1807 to the Botanical Garden at Calcutta." They observe no one appears to have found it but Dr. Berry. I consider this alleged Indian station to have originated in some garden mistake (*vide supra*, p. 11). It is well represented in Dr. Roxburgh's Collection of Drawings (fig. 2242).

b. Stamina circa 15, irregulariter polyadelpha; ovula sæpius geminata.

[A. HINDSII.—Sclerostylis Hindsii, *Champ. in Kew Misc.* iii. 328; *Seemann, Voy. Herald.* p. 369, t. 82.—Atalantia monophylla, *Benth. in Lond. Journ. Bot.* i. 483.

Loc. Hong Kong! *Champion, Hinds, Wilford.*

The ovary seems normally bilocular, with a pair of ovules in each cell; when trilocular, one cell is uniovulate. Of *Sclerostylis venosa* (Champ. Hook. Journ. Bot. & Kew Misc. iii. 327, and Seemann, Voy. Herald, 369), I have seen only very imperfect specimens. I think it safest to consider it a variety of *A. Hindsii*, differing in the elliptical, venose leaves. obtuse at the base, and the calyx 5-merous or 4-merous.]

2. TRIPHASIA, *Loureiro Flora Cochinchinensis* (ed. 1790), vol. i. p. 152; *DC. Prod.* i. 535.

[T. TRIFOLIATA. *DC. Prod.* i. 536.

T. aurantiola, *Lour. l. c.* p. 153; *Wall. Cat.* 6381.—Limonia trifoliata, *L. Mantissa*, alt. 237.—L. diacantha, *DC. l. c.*—L. trifolia, *Burm. Fl. Ind.* (1768), p. 103, tab. 35. fig. 1.

I have seen specimens from both East and West Indies, northern states of South America, and India, but probably all from cultivated plants. It would appear to be a Chinese species, but I have not seen native specimens.]

[T. GLAUCA, *Lindl. in Mitchell's Trop. Aust.* p. 353. *Frutex* verisimiliter, ramosissimus, glaucus, spinosus. *Ramuli* teretes, glabri v. minute puberuli, spinis axillaribus, solitariis, rectis, 1–6 unc. long., armati. *Folia* simplicia (unifoliolata?), coriacea, lineari-spathulata v.

linearia, in petiol. angustata ½–1½ unc. long., 1–3 lin. lata. *Flores* solitarii v. 2–3 fascic. parvi, brevissime pedicellati. *Calyx* 3-4-5-lobatus, lobis interdum 1–2 minoribus. *Petala* 3 (interdum 4 v. 5), libera, æstivatione imbricata. *Stamina* 9–12–21, libera, subæqualia. *Ovarium* in toro carnoso, brevi-elevato, impositum, 3 (v. nonnunq. 4–5?)-loculare; ovulis solitariis, v. in loc. unico geminatis superimpositis. *Stylus* continuus, brevis, crassus, stigmate obtuso. *Baccæ* 2-4-loculares. *Semina* 2– ?. *Cotyledones* carnosæ, interdum inæquales, plus minus plano-convexæ. *Radicula* brevissime exserta.

Loc. In Australia subtropica! *Mitchell*, in *Hb. Hook.*; Burdekin! *Mueller*.]

[T.? sarmentosa, *Bl. Bijd.* i. 132. *Vide supra*, p. 14*.]

3. Limonia, *Linn. Gen. Pl.* 534 (1764); *DC. Prod.* i. 536.

1. L. acidissima, *L. Sp. Pl.* (ed. 2), i. 554; *DC. l. c.*

L. crenulata, *Roxb. Cor. Pl.* i. t. 86; *Fl. Ind.* ii. 381; *Wall. Cat.* 6364. —L. ambigua, *Nutt. Sill. Journ.* v. (1822) 295.—Hesperethusa, *Roem. Syn. Monog.* fasc. i. 38.

Loc. India bor.-occid.! *Edgeworth, Hb. Benth.*; Simla!? *Thomson*, 4000 ped.; Bombay! *Getune.*; Madras! *Shuter, Hb. Hook.*; Mungyer Hills and Tetaura, *Hb. Wallich.*

Calyx 4 (v. 5) -fidus v. lobatus; lobis ovato-rotundatis v-triangularibus. *Petala* 4, libera, oblonga v. elliptica. *Stamina* 8, libera, subæqualia, filamentis subulatis; antheris cordato-oblongis. *Discus* annulatus v. brevi-stiptiformis. *Ovarium* 4-loculare; ovulis solitariis, pendulis. *Stylus* brevis, crassiusculus, ovario repente angustior, stigmate obtusiusculo. *Baccæ* globosæ, 1-4-spermæ.

Frutex spinosa. *Folia* jugatim pinnata, rachide alata. *Flores* in racemis sæpe foliatis v. fasciculis cymosis, pedunculatis, axillaribus.

Limonia? pubescens, Wall. Cat. 6365. Of this I have seen the very imperfect specimens of the Wallichian Herbarium. It seems nearly allied to *L. acidissima*; perhaps a form with the young leaves, and veins pubescent or puberulous. It is from near Toong Doong, Birma.

2. L. alata, *W. & Arn. Prod. Fl. Peninsula*, p. 92.; *Wall. Cat.* 6363.

Loc. Peninsula Ind. or.! *Wight.* Ceylon, ex *Thwaites, En. Pl. Zeyl.* p. 45.

Calyx 5-lobatus, lobis triangularibus. *Petala* 5, libera, æstivatione imbricata. *Stamina* 10 (v. 8), subæqualia, filamentis lineari-subulatis antheris lineari-oblongis. *Discus* parvus, annulatus. *Ovarium* 5-4-loculare; ovulis in loc. geminatis, pendulis, collateralibus v. oblique superimpositis. *Stylus* continuus, longiusculus, ovario paulo longior; stigmate capitato. *Baccæ* globosæ, circa pollicem in diam. *Semina* plurima. *Cotyledones* carnosæ, æquales v. subæquales.

Arbuscula (*fide* Thwaites) ramosa, sæpius spinosa. *Folia* trifoliolata.

* Mr. Thwaites has kindly sent me a fragment forwarded to him from the Java Botanic Garden under the name of *Triphasia sarmentosa*, Bl. It is, as Mr. Thwaites considers it, a *Luvunga*, apparently the *L. eleutherandra*, of Dalzell. The stamens are free, the ovary bilocular, the ovules geminate, superimposed.

Limonia retusa (Don. Fl. Nep. Prod. 224), I do not know. It would appear to be an *Atalantia* from his description.

4. Murraya, *Linn. Mantissa*, alt. 563; *DC. Prod.* i. 537.

Char. emend. *Calyx* 5-fidus v. partitus. *Petala* 5, libera (lineari-oblonga v. obovato-lanceolata). *Stamina* 10, libera, alterna breviora; filamentis lineari-subulatis; antheris parvis, late ellipticis v. rotundatis. *Ovarium* in toro brevissimo, elevato, impositum, 2–3–5-loculare; ovulis in loculis solitariis geminatisve, superimpositis v. fere collateralibus. *Stylus* longiusculus, denique basin versus sejungens, stigmate capitato. *Bacca* 1–2-sperma. *Semina* testa glabra v. lanata. *Cotyledones* æquales, planoconvexæ. *Arbores* v. *frutices* inermes. *Folia* pinnata. *Flores* in cymis multifloris, corymbosis, terminalibus, v. paucioribus in axillis foliorum superiorum.

1. M. exotica (*L. Mantissa, l. c.*) Foliis glabris, 3–8-foliolatis; calycis lobis triangularibus oblongis v. lineari-oblongis, ovario biloculari, ovulis in loculis geminatis superimpositis v. interdum solitariis.

Chalcas, *Linn. Mant.* 68; *Burman. Fl. Ind.* 104; *Loureiro, Fl. Coch. Chin.* p. 270.—Marsana, *Sonnerat, Voy.* tab. 139.

α. Floribus in cymis corymbosis multifloris.—*M. exotica*, DC. Prod. i. 537; Wall. Cat. 6368!

β. Floribus majoribus paucioribus, calycis lobis angustioribus.—*M. paniculata*, Jack. Mal. Misc. 1. n. 2. 31; DC. Prod. i. 537.—*M. Sumatrana*, Roxb. Fl. Ind. ii. 375. Wall. Cat. 6369.

Loc. α. Kumaon, 4000 ped! *Strachey* & *Winterbottom*; Assam! *Hb. Hk.*; Hong Kong! *Hb. Benth.*; Loo-choo! *Wright*; China! *Millett*; Java, *Zollinger*, 129; New Hebrides! *Milne*.

β. Peninsula Ind. or., *Hb. Wight.*; Ind. bor.-occid! *Edgeworth*; Ceylon! *Gardner, Macrae*; Banjarmassing! Borneo, *Motley*.

The extreme states of these varieties look very diverse, but they are connected by transitional links, The leaflets vary much in form and size, being lanceolate, ovate, or obovate-lanceolate, and often acuminate. In var. *β*, the flowers are sometimes nearly solitary; while in *α*, they often form close cymose corymbs. In the Wallichian Herbarium are imperfect specimens of a *Murraya* from Toong Doong, evidently allied to var. *β*. of the above, labelled *M. elongata*. Alph. DeCandolle. The leaflets are shining, acuminate, and 2 to 4 inches in length. The inflorescence would seem to have consisted of few-flowered cymes. It is perhaps but a large-leaved variety of *M. exotica*.

[*Limonia lucida* (Forst. Prod. 33). This plant is described "inermis, foliis simplicibus, pedunculis axillaribus," and as occurring at Mallicollo. Forster's specimen from that island in the herbarium of the British Museum is clearly *Murraya exotica*, var. *β*. There must be some mistake, very probably in the description.]

2. Murraya Glenieii (*Thwaites, MSS*). Ovario 5- v. 4-loculari, ovulis solitariis v. geminatis superimpositis.

Loc. Trincomalee, Ceylon! *Thwaites, Hb. Hook.*

Differing from *a* of the preceding, which it closely resembles, in the number of cells to the ovary. I almost doubt its specific distinctness, although I have always found *M. exotica* to have a bilocular ovary.

[M. crenulata. Foliis glabris 4–12 (6–10)-foliolatis, calycis lobis ovatis v. ovato-rotundatis, ovario 5-loculari, ovulis in loculis solitariis v. interdum geminatis, tunc superimpositis v. fere v. omnino collateralibus.

Glycosmis crenulata, *Turcz. Mosc. Bull.* 1858, p. 250.

Loc. Philippines, 355! *Cuming.* (Luçon) 469! *Lobb.*

Folia sæpius 6–10 unc. longa, foliolis valde obliquis, oblongo-ellipticis v. ovato-oblongis, breviter acuminatis, obtusis v. emarginatis, obsolete crenulato-serratis, sæpius 2–3 lin. long. Flores in corymbis cymosis terminalibus multifloris. Pedicelli puberuli, 2–3 lin. longi. Petala obtusa v. lineari-oblonga, medio crassiora. Stylus longiusculus, ovarium circiter æquans, cito basi v. prope basin sejungens. Fructum non vidi.]

3. M. Königii (*Sprengel. Syst. Veget.* ii. 315). Foliis 10–20 foliolatis, calycis lobis triangularibus, ovario biloculari, ovulis solitariis v. interdum geminatis oblique superimpositis v. fere collateralibus.

Bergera Königii (*L. Mantissa alt.* p. 563; *DC. Prod.* i. 537; *W. & Arn. Prod.* 94).

Loc. Ceylon! *Thwaites* (*C. P.* 2547, 1203); Bombay, *Dalzell* (Concan! *Law & Stocks*); Bengal! *Griffith, J. D. Hooker* (Khasia and Silhet); Kumaon! *Thomson*; Ind. bor.-occ., *Royle & Edgeworth*; Sikkim! 1000–2000 ped., *J. D. Hooker.*

This well-known species has been very fully described. For notice of its occasionally biovulate condition, *vide supra*, p. 15. Frequently cultivated.

(*M.? longifolia.* Bl. Bijd. i. 137. This Java plant is quite unknown to me. Blume speaks of its flowers as racemose, and the stigma as sessile. It must be a very doubtful associate of *Murraya*.)

5. Clausena, *Burm. Flor. Ind.* p. 87. *DC. Prod.* i. 538.

Calyx 4–5-lobatus v. partitus. *Petala* 4–5, libera, sæpius tenera elliptica v. rotundata, æstivatione marginibus imbricata. *Stamina* 8–10, libera, alterna paulo breviora; filamentis medio v. infra dilatatis, sæpe fornicato-concavis, apice subulatis; antheris ovatis v. ellipticis, v. rotundato-ellipticis. *Ovarium* 4–5-3 (rarius 2)-loculare; ovulis geminatis, superimpositis v. collateralibus. *Stylus* sæpius distinctus, denique sejungens. *Bacca* (§ 1) 5 v. 4, v. (§ 2) abortu, 1–2 locularis. *Embryonis* cotyledones æquales, plus minus planoconvexæ. *Arbores frutices* v. *suffrutices*, inermes, foliis pinnatis. *Inflorescentia* terminalis v. axillaris, paniculata v. laxe racemosa, floribus sæpius cymosim aggregatis.

§ 1. *Flores tetrameri* (in *C. brevistyla* et *C. heptaphylla* interdum pentameri.)

* *Inflorescentia terminalis, paniculata.*

1. C. PENTAPHYLLA (? *DC. Prod.* i. 538; *Don. Gen. Syst.* i. 586). Foliis 3–5–7-foliolatis, ovario piloso, stylo fere glabro brevissimo.

Amyris pentaphylla? *Roxb. Fl. Ind.* ii. 247.—'A. pentaphylla, *Roxb.*'; *Wall. Cat. ex Hort. Bot. Calc.*!——? Limonia? *mollis. Wall. Cat.* 6362.*

Loc. India bor.-occidentali! *Edgeworth, Hb. Benth.* Prope Cawnpore. *fide Roxb. l.c.* p. 248.

Frutescens (fide *Roxb.*). *Ramuli* breve v. scabride pubescentes. *Folia* 6–12 unc. *Foliola* utrinque in nervis sæpius pubescentia, pagina sup. denique fere glabra v. glabrescens, 4–8 unc. longa, ovali- v. ovato-elliptica, vix acuminata, apice obtusiuscula, retusa v. emarginata, margine plus minus obsolete undulato-crenulata. *Panicula* 2–10 unc., ramis breve hirsutis. *Pedicelli* brevissimi, 1 lin. et infra. *Calyx* 4-lobatus, v. dentato-lobatus. *Petala* 4 extus plus minus pilosa v. fere glabra. *Stamina* 8, alterna parum breviora; filamentis medio dilatatis, apice subulatis. *Ovarium* stipitatum, 4-sulcatum, pilosum, 4-loculare; ovulis geminatis superimpositis, stipite glabro v. subglabro. *Stylus* brevissimus, crassiusculus, ovarium æquans v. eodem brevior. Stigma 4-lobulatum, subcapitatum v. fere æquilatum. *Bacca* (fide *Roxb. l. c.*) ovata, obtuse apiculata, monosperma.

The plant distributed by Dr. Wallich under 8519 A. certainly looks somewhat different from Mr. Edgeworth's specimens, though I am unable to distinguish them specifically. The leaflets are fewer and, proportionally, considerably larger, less pubescent, and thinner in texture.

The inflorescence of Dr. Wallich's plant is smaller, and its ramifications more slender. Dr. Roxburgh states in 'Flora Indica,' *l. c.* p. 248, that there are "many ovula" in each cell of the ovary. This, I think, must be an error. I identify his plant by the Wallichian specimen,—which is the *Amyris pentaphylla* of the Calcutta garden,—as well as by Dr. Roxburgh's figure in the East India Company's drawings, and his description, apart from this item of the ovules.

2. C. HEPTAPHYLLA, *Wt. & Arn. Prod. Flor. Penins.* p. 95 (in annot.). Foliis 7 (5–9)-foliolatis, foliolis basi fere æqualibus v. leviter obliquis, ovario plus minus obovato 4-sulcato-lobulato glabro, glandulis immersis sæpe mammillato, stylo ab ovario distincto subæquilongo, stigmate æquilato.—*Wall. Cat.* 8508.

Amyris heptaphylla, *Roxb. Flor. Ind.* ii. p. 248, et tab. (*Mus. E.I.C.*) 1054.

Loc. Circ. Calcuttam, *fide Roxb. l. c.*; Silhet! *Wall. Hb.*; Khasia, 0–4000 ped., et Chittagong! *J. D. H. & T. T.* (? var. pubescens, Cookia? macrophylla, *Ldl.*, *Wall. Cat.* 6367, ripa fl. Saluen).

Frutex.—*Folia* 6–16 unc. longa. *Petioluli* 1½–2 lin. long. *Foliola*

* Very probably a true synonym, but the only specimen in *Hb. Wallich.* is a poor one. It is from Oude.

mag. variabili, terminalia sæpe majora, 2½–4 (–6) unc. longa 1–1¾ (–3¼) unc. lata; ovalia v. ovato-lanceolata, plus minus acuminata, apice obtusiuscula v. subacuta, margine obsolete repando-denticulata v. crenulata, supra glabra v. secus costam venulasque leviter pubescentia. *Panicula* terminalis ramis patentibus, cymosim di-trichotomis. *Pedicelli* brevissimi, 1 lin. vix exced. v. breviores. *Calyx* lobis ovato-triangularibus v. rotundatis. *Ovarium* breve et anguste stipitatum. *Ovula* superimposita. *Bacca* jun. oblonga, 1-sperma.

The flowers are sometimes pentamerous. Distinguished from other terminal-panicled *Clausenæ* by the obovate, sulcate, glabrous ovary, often glandular, and the style about equal to it in length.

[C. BREVISTYLA, sp. n. Foliis 10–15-foliolatis, foliolis valde obliquis, ovario plus minus obovato basi angustato sursum 4-lobulato glabro v. fere glabro, stylo ab ovario distincto, brevissimo, ovario dimidio breviore, stigmate æquilato.

In 'Hope Islets!' *M'Gillivray, Hb. Hook.*

Frutex? *Folia* 5–8 unc. longa. *Petioluli* circa 2 lin. longi. *Foliola* oblique v. rhomboideo-ovalia v. ovata, apice vix acuminata, emarginata, margine undulato-crenata v. dentata, glabra v. in junioribus secus costam pubescentia, 1–4½ unc. long., 10 lin.–1½ unc. lata. *Calyx* 4–5-fidus, lobis late ovatis. *Petala* 4–5, tenera, late elliptica v. rotundata. *Stamina* sæpe 10, filamentis infra crassioribus, dilatatis, subfornicatis. *Ovarium* glabrum, vel pilis paucis instructum, 4–5-loculare. *Ovula* geminata (superimposita?). *Stigma* stylo æquilatum. *Fruct.* non vidi.

Resembles *C. heptaphylla* very closely, differing in the conspicuous obliquity of the leaflets and the very short style, inserted in both species in the central apical depression of the ovary. The flowers are often pentamerous.]

3. C. EXCAVATA, *Burm. Flor. Ind.* p. 87. Foliis multi (15–30)-foliolatis, foliolis basi obliquis, ovario anguste stipitato subtetragono ovato v. elliptico piloso v. hirsuto, stylo basi ab ovario vix abrupte distincto crassiusculo ovarium sæpe æquante.—*DC. Prod.* i. 538.

Murraya Burmanni, *Sprengel. Syst. Veg.* ii. 315.—Amyris (Clausena, *W. & A. Prod. Fl. Penins,* p. 95) sumatrana, *Roxb. Fl. Ind.* ii. 250. —A. (Clausena, *W. & A. l. c.* p. 95) punctata, *Roxb. l. c.* p. 251.—Cookia graveolens, *Wt. & Arn. Prod.* p. 95; *Wall. Cat.* 8515.

Loc. Sikkim! 2000 ped., *J. D. H.*; Silhet! Penang et Rangoon! *Hb. Wall.*; Malacca! *Griffith*; Java! *Lobb., Horsfield & Zollinger,* 447 *in Hb. Hk.*; Banjarmassing, Borneo! *Motley,* 279, *Hb. Hk.*—Var. β, foliolis angustioribus, Bhotan! *Griffith.*—Var. γ, breve pilosa, Rangoon! *M'Clelland, Hb. Hk.*

Folia 6–15 unc. longa. *Petioluli* sæpius 1–1½ lin. *Foliola* basi valde obliqua, lanceolata v. ovato-lanceolata, sæpe acuminata, apice obtusa v. fere acuta, margine obscure undulato-crenulata, plus minus pubes-

centia v. interdum supra glabrescentia, sæpius $1\frac{1}{2}$–$2\frac{1}{2}$ unc. longa, 8–12 lin. lata (in var. β 4–7 lin. lata). *Panicula* elongata v. pyramidalis, folia superans v. iisdem brevior. *Flores* subsessiles v. brevissime pedicellati. *Calyx* 4-rotundato-lobulatus v. lobis ovato-triangularibus. *Petala* tenera, elliptica v. rotundata. *Stamina* subæqualia v. alterna parum breviora, filamentis infra dilatatis concavo-fornicatis. *Ovarium* 4-loculare, ovulis geminatis, superimpositis; *disco* ad ovarii stipitem accreto, sæpius glabro. *Stylus* demum basi sejungens, glaber, 4-sulcatus v. tetragonus, stigmate æquilato v. vix latiore. *Bacca* glabra v. sparse pilosa, 1-sperma.

Distinguished by the hairy ovary, which is ovate or elliptical, not depressed in the apex. The style often seems almost narrowed gradually from the ovary. The leaflets are often very numerous.

** Inflorescentia axillaris, paniculata, v. racemosa. (Flores tetrameri, in *C. Willdenovii* rarius pentameri.)

a. Species extra-Africanæ.

4. C. Willdenovii, *W. & Arn. Prod. Fl. Penins.* p. 96. Foliolis 5–9–13 basi plus minus obliquis, floribus cymosis in paniculis subracemosis v. racemis, pedicellis gracilibus, ovario breviter et anguste stipitato plus minus 4-sulcato v. tetragono glabro, stylo crassiusculo ovarium æquante v. paulo excedente, bacca rotundata 1–2 sperma.

C. pubescens, *W. & Arn. l. c.*—Amyris dentata, *Willd. Sp. Pl.* ii. 337.

β (*nana*). Foliis minoribus, inflorescentia racemosa.—*C. nana*, W. & Arn. *l. c.*—*Amyris nana*, Roxb. Fl. Ind. ii. p. 249, et tab. (Mus. E.I.C.) 1408.

Loc. Concan! *Stocks*; Madras! *Shuter*; Nilghirisi! *Hb. Hk.*; Ceylon! *Thwaites* (*C. P.* 1204) *& G. Thomson.*—*Forma pubescens*, Ceylon! *Thw.* (*C. P.* 2546).—Var. β, Nilghiris, *Hb. Hk.*

Frutex v. fruticulus. Ramuli glabri v. breviter pubescentes. *Folia* $2\frac{1}{2}$ (var. *nana*) –12 poll. longa glabra v. pubescentia. *Foliola* subsessilia v. petiolulata (0–2 lin.), oblique ovata v. ovato-lanceolata, sæpius acuminata, apice obtusiuscula v. minute emarginata, margine crenulata, 2–3 unc. longa (in var. *nana* $\frac{3}{4}$ unc.), 4 lin.–$1\frac{1}{4}$ unc. lata. *Flores* inferiores in cymis 3-floris laxis, v. 1-floris, interdum in racemis dispositis. *Pedicelli* 1–5 lin. longi. *Calyx* 4 (rar. 5) -partitus v. lobatus, lobis plus minus ovatis. *Stamina* 8, filamentis infra dilatatis, subfornicatis. *Ovarium* superne 4-lobulatum v. sulcatum, 4-loculare, ovulis superimpositis. *Bacca* rotundata, subsicca, pisi magnitudine *.

A variable plant. Some forms, especially of var. *nana*, much resemble *Clausena inæqualis* of Southern Africa. The inflorescence in this species is always axillary: when paniculate the flowers are disposed in small lateral cymes; in var. *nana* it is often reduced to simple racemes, with the flowers on slender, rather long pedicels.

* Lieut. Beddome has favoured me with specimens of this *Clausena* from the Anamallay Hills, where it bears a delicious fruit—somewhat similar, I think in size to that of the Wampi.

5. C. SUFFRUTICOSA, *Wt. & Arn. Prod. Fl. Penins.* p. 96 (in annot). Foliis 11–17-foliolatis, floribus in paniculis laxis racemosis v. in racemis, pedicellis gracilibus cymosim subumbellatim v. subverticillatim dispositis, ovario glabro, ovato v. subsphærico v. sulcato, stylo ovarium æquante v. paullulo excedente.—*Wall. Cat.* 8514.

Amyris suffruticosa, *Roxb. Fl. Ind.* ii. p. 250, et tab. (*Mus. E.I.C.*) 1409.

Loc. Chittagong, *fide Roxb. l. c.*

Suffrutex (fide Roxb.).—*Ramuli* breve pilosi denique glabrescentes. *Folia* 12–16 poll., rhachide breve pilosa v. pubescentia. *Foliola* subsessilia v. breviss. petiolulata, plus minus obliqua, oblonga v. ovato-oblonga, v. terminali rhomboideo-elliptica, plus minus acuminata, apice acutiuscula v. obtusa, pubescentia v. pagina sup. demum glabrescentia, sæpius 2–4 unc. long., 1–1¾ lata. *Paniculæ* v. racemi 3–6 poll. long., apicem versus ramulorum in axillis foliorum, foliis breviores. *Pedicelli* breve et patente pilosi, 1½–2 lin. *Calyx* 4-partitus, lobis ovatis. *Petala* 4, tenera. *Stamina* 8, filamentis infra medium dilatatis subfornicatis. *Ovarium* brevissime stipitatum, glabrum, glandulis immersis minute mamillosum, 4-loculare, ovulis superimpositis. *Bacca* (fide Roxb.) dependens, fusiformis v. ovalis, aurantiaca, fere poll. longa, 1-sperma.

Near to *C. Willdenovii*, from which its more numerous leaflets, rounded ovary and more slender style, and the form of the fruit, appear chiefly to distinguish it.

b. Species Africanæ.

[C. INÆQUALIS, *Benth. Flor. Nigrit.* p. 257. Foliolis 9–15–17 rhomboideo-ovatis, floribus in racemis laxis aut paniculis racemosis foliis sæpius brevioribus, ovario glabro 4–2-sulcato 3–4–2-loculari, ovulis geminatis fere collateralibus, stylo ovarium vix excedente, baccis rotundatis 1-spermis.

Myaris inæqualis, *Harvey & Sonder, Fl. Cap.* i. p. 444, cum syn.

Var. β. Foliolis parvis angustioribus.

Loc. C. B. S.! *Miller, Harvey*; Natal! *Peddie, Hb. Bth.*; Cape Coast! *Vogel, Hb. Hk.* (sub n. *Cl. anisata*).

Frutex v. arbor, parva, 10–20-ped. *Ramuli* pubescentes denique glabrescentes. *Folia* 3–5-poll.; foliolis inæquilateralibus, interdum apicem versus leviter angustatis, apice obtusis v. subemarginatis, crenulatis, ½–1½ unc. longis, 3–12 lin. latis. *Pedicelli* 1–2 lin. longi. *Calyx* 4-partitus, lobis ovatis v. triangulari-ovatis. *Stamina* 8, alterna paulo breviora. *Ovarium* brevi-stipitatum, 2–4-gonum v. sulcatum; ovulis brevissime funiculatis. *Stigma* lobulatum, stylo equilatum. *Bacca* 1-sperma, rotundata v. elliptica, pisi magnitudine.

Harvey and Sonder, *l. c.*, state the ovary to be 3-celled; it commonly is so, but varies with 4 or 2 cells. Vogel's plant from Cape Coast (*C. anisata*, Hk. fil. Flor. Nigrit. p. 256) appears identical with some forms of this species.]

[C. ANISATA (*non Hk. fil.*). Foliolis 10–20, paniculis laxis elongatis foliis brevioribus v. longioribus, ramulis lateralibus cymosim divaricatis gracilibus pubescentibus, ovario 4-sulcato 4-loculari, ovulis geminatis oblique superimpositis v. fere collateralibus.

Amyris anisata, *Willd. Sp. Pl.* ii. p. 337.—Fagarastrum anisatum, *Don. Gen. Syst.* ii. p. 87.

Loc. Abbeokuta! *Irving*; Idda, ad fl. Niger! *Barter in Hb. Hook.*

Suffrutex 3-pedalis, floribus albis. *Folia* 6–12 poll.; foliolis inæquilateralibus, oblique ovatis v. ovato-oblongis, obscure crenulatis, interdum leviter acuminatis v. emarginatis, pubescentibus. *Paniculæ* 6–9 unc. longæ, elongatæ, in axillis foliorum superiorum. *Pedicelli* 2–3–1 lin. longi. *Bracteolæ* minutæ, ovatæ v. lanceolatæ. *Calyx* 4-partitus, lobis ovatis. *Stamina* filamentis medio abrupte dilatatis, sursum subulatis. *Ovarium* breve stipitatum, glabrum. *Stylus* longiusculus, crassiusculus, 4-sulcatus, basi sejungens.

Differs from *C. inæqualis* in the much larger foliage and more paniculate inflorescence. I have not seen fruit.]

§. *Flores sæpissime pentameri. Inflorescentia paniculata, terminalis.*

* Ovula superimposita.

[C. WAMPI, *Blanco, Flor. Fil.* p. 358. Ovario fasciculato-piloso 5-loculari, stylo brevi ovario vix æquilongo.

Cookia punctata, *Sonnerat. Voy.* ii. p. 130. t. 131; *DC. Prod.* i. p. 537.

Loc. In India cult. in hortis. Species verisimiliter Chinensis.

Arbor v. Arbuscula.—Ramuli primum breve pube scentes v. puberuli. *Folia* 5–7–9-foliolata, 8–10 poll. *Foliola* ovato-elliptica, lanceolata v. ovata, petiolulata (1–3 lin.); basi plus minus obliqua, apice obtusa v. subemarginata, interdum quasi mucronulata, vix acuminata, margine undulato-crenulata v. obsolete serrulata, demum glabra v. glabrescentia, in costa autem venisque pag. inf. sæpius sparse scabrida v. puberula, terminali sæpe 2½–4 poll. long. *Flores* subsessiles v. brevissime pedicellati, in paniculis multifloris cymosim dispositi. *Calyx* 5 (interdum 4) -partitus, lobis triangularibus v. ovatis. *Petala* 5, æstivatione parum imbricata. *Stamina* 10, alterna paulo breviora, filamentis infra medium dilatatis, complanatis, supra subulatis; antheris oblongis v. ellipticis basi cordato-sagittatis, glandula dorsali instructis. *Ovarium* breve stipitatum, glandulosum, sæpissime 5-loculare, ovulis geminatis, superimpositis, superiore lateraliter v. basin prope peltato, inferiore subpendulo. *Stylus* brevissimus, distinctus, sursum glaber, stigmate 5-lobulato, stylo vix latiore. *Bacca* sæpius 5-locularis, 5-sperma v. abortu 1-sperma v. sterilis, ovato-globosa, pubescens, 1 unc. et infra. *Cotyledones* carnosæ, æquales.

In reducing this plant to the genus *Clausena*, I have adopted the specific name *Wampi* (from its vulgar appellation) after Blanco. To retain the name *punctata* might lead to confusion with *C. punctata* of Wt. & Arn.,

which latter, however, I refer to *C. excavata*, Burm. I have only seen cultivated specimens from India and the Mauritius. It is probably a native of Southern China, as stated by Retzius. Loureiro did not find it wild in Cochin China, nor Blanco in the Philippines. Hasskarl and Miquel have confused *Micromelum* with this well-known species; the latter gives the Moluccas, Timor, and Java as localities. It is probably introduced.]

[C. (sp. nova ?). Ovario glabro 5-loculari, ovulis superimpositis, stylo pentagono ovario æquilongo, foliis inflorescentiaque plus minus hirsutis.

Loc. Philippines! *Cuming*, 1872, *Hb. Hook.*

Ramuli inflorescentiaque cinnamomeo-velutino-pilosi. *Folia* 11–21-foliolata, 12–20 poll. *Foliola* petiolulata (1½–3 lin.), valde obliqua, rhomboideo-lanceolata v. ovato-lanceolata, leviter acuminata, margine obsolete crenulata, utrinque præcipue ad costam nervasque sparse pilosa v. hirsuta. *Panicula* hirsuta, 15–17 poll., valde ramosa, floribus in cymis aggregatis, brevissime pedicellatis v. sessilibus. *Calyx* profunde 5-lobatus, lobis ovatis vix acutis. *Petala* elliptica, navicularia, submembranacea, glabra. *Stamina* 10, filamentis glabris, infra dilatatis crassioribus, sursum subulatis; antheris glandula instructis. *Ovarium* brevissime stipitatum, obovatum. *Ovula* geminata, superimposita, superiore fere peltato, infer. subpendulo, funiculato. *Stylus* basi leviter constrictus, mox sejungens.

I have not seen the fruit. Very like the *Wampi*, from which its much longer and narrower leaflets, glabrous ovary, and longer style, distinguish it.]

6. C. Wallichii. Foliis 13–17-foliolatis, ovario glabro 5-loculari, stylo distincto ovario breviore v. vix æquilongo, foliolis acuminatis glabris.

Bergera Wallichii, *A. DC. MS. in Hb. Wallich.*

Loc. Chapedong Hill, Birma! *Hb. Wallich.*

Folia rachide leviter alata, foliolis rhomboideo-lanceolatis oblongisve, acuminatis, margine crenulatis, glabris. *Inflorescentia* paniculata, multiflora, ramulis strictis, floribus parvis. *Calyx* 5-partitus, lobis ovatis. *Petala* 5, margine leviter æstivatione imbricata, tenera. *Stamina* 10, libera, filamentis medio crassioribus, primum infra leviter subfornicatis. *Ovarium* breve anguste stipitatum, 5 (v. 4) -loculare, ovula oblique superimposita. *Stylus* brevissimus, sulcatus, stigmate æquilato.

When the ovary is 4-locular, the ovules in one cell at least appear to be truly collateral. This plant thoroughly unites the genera *Piplostylis* and *Clausena*: and not only does it closely bind these genera, it much weakens also the generic distinctness of *Murraya*, some species of which are mainly to be distinguished from pentamerous species of *Clausena* by the proportionally elongated style, more capitate stigma, form of inflorescence, larger flowers with narrower petals, and perhaps in the less stipitate ovary and disk.

** Ovula collateralia.

7. C. INDICA, *Dalzell in Kew Misc.* iii. p. 33, t. 2. Foliis 7–11-foliolatis, ramulis floriferis inferioribus strictis adscendentibus plus minus elongatis, calyce 5-fido v. partito, lobis late ovatis v. ovato-rotundatis, ovario 3- (interdum (4–5–2-) -loculari.

Bergera nitida, *Thw. En. Pl. Zeyl.* p. 46.

Loc. Bombay! *Dalzell, Hb. Hook.*; Ceylon! *Walker* (Hantam, 3000 ped.), *Gardner, Thwaites* (C. P. 2421).

Frutex v. arbor mediocris (fide Dalzell & Thwaites).—*Ramuli* puberuli. *Folia* sæpius 6–10 unc. *Foliola* obliqua, elliptica v. ovato-lanceolata v. lanceolata, $1\frac{1}{4}$–3 unc. long., subcoriacea, crenulata v. integra, obtusa, sæpe leviter acuminata, glabra, v. costa minute puberula. *Pedicelli* brevissimi, $\frac{1}{2}$–1 longi. *Flores* parvi. *Petala* oblonga v. elliptica. *Filamenta* infra leviter dilatata, complanata. *Ovarium* globosum v. oblongum, glabrum, glandulis numerosis papillosum. *Bacca* 1-sperma, sphærica, pulposa, flava (*fide Thwaites*).

[C. ——? Foliis 6–9-foliolatis, ramulis floriferis secundariis sæpius brevissimis, calyce 5–4-lobato, lobis ovato-triangularibus, ovario 5-loculari.

α. (*glabra*). Java! *Zollinger, Hb. Hook.*

β. (*pubescens*). Java! *Horsfield, Hb. eod.*

Suffrutex (v. frutex?) pubescens v. glaber. *Folia* 6–9 unc. *Foliola* ovalia v. plus minus ovata, vix obliqua, apice obtusa v. emarginata, obsolete crenulato-serrata v. integra, glabra v. sparse pilosa vel pubescentia. *Panicula* terminalis parva, floribus subsessilibus v. brevissime pedicellatis, cymosim aggregatis. *Ovarium* ovato-rotundatum, supra 5-lobulatum. *Stylus* brevissimus, 5-sulcatus, crassus.]

6. GLYCOSMIS, *Correa de Serra, Ann. du Museum,* tom. vi. 384; *DC. Prod.* i. 538.

Calyx 5-partitus; lobis latis, marginibus imbricatis. *Petala* 5, libera, oblonga v. elliptica v. rotundata, æstivatione imbricata. *Stamina* 10, libera, alterna breviora, filamentis infra plus minus dilatatis, sursum subulatis; antheris ovatis v. oblongis, parvis (sæpe glandula dorsali v. apicali instructis). *Ovarium* in toro discoideo vel brevissime stipitiformi impositum, 5–4–3–2-loculare; ovulis in loc. solitariis, pendulis. *Stylus* brevissimus, cum ovario continuus (sæpe fere æquicrassus), persistens, stigmate æquilato v. vix latiore. *Bacca* succoso-pulposa v. subsicca, 1 (nonnunquam 2–3)-sperma. *Cotyledones* carnosæ, æquales. *Radicula* brevissima.—*Arbores* v. *frutices* inermes. *Folia* pinnata v. simplicia (unifoliolata). *Flores* sæpius in paniculis cymosis axillaribus v. nonnunquam terminalibus, parvi.

1. G. PENTAPHYLLA, *Correa, l. c.* 384. Foliis 3–5–1-foliolatis, ovario 5 (interdum 4, rariss. 3) -loculari glabro, stylo brevissimo crasso. *DC. Prod.* i. 538.

G. arborea, *DC. l. c.*—? Limonia pentaphylla, *Retz. Obs.* v. 24.—L. pentaphylla (Tab. 84), and L. arborea (tab. 85), *Roxb. Cor. Pl.*

Species maxime polymorpha quum characteribus tum habitu.

Var. *a.* Foliis sæpius 3 (1–5) -foliolatis, foliolis lanceolatis oblongo- v. obovato-lanceolatis integris v. obsolete crenulatis 4-9 unc. longis, paniculis sæpe elongatis, multifloris, apicem versus ramulorum dispositis, ovario sæpius glandulis elevato-mammillato 5-loculari, disco ad basin ovarii connato.

Subvar. 1. Foliolis angustioribus.

Var. *β.* Foliis sæpius 3–5-foliolatis (in subvar. 1. 1-foliolatis), foliolis ellipticis v. elliptico-lanceolatis, paniculis parvis pauci-multifloris (floribus minoribus), ovario 5 (in spp. Austral. sæpius 4) -loculari vix glandulis mammillato, basi ab gynophoro brevissimo incrassato per constrictionem distincto.—*G. triphylla*, Wight in Hook. Bot. Misc. iii. 298. tab. supp. 39; Wt. & Arn. Prod. 93.—*G. nitida*. Wt. & Arn. *l. c.*

Subvar. 1 (*longifolia*). F. sæpe unifoliolatis, lamina oblonga v. obovato-lanceolata sæpius acuminata, 3–10 unc. longa, paniculis brevibus 1–2 unc. v. (terminalibus) 3-4 unc.

Subvar. 2 (*Chinensis*). F. 2–3- sæpe 1-foliolatis, foliolis oblongo-lanceolatis v. lanceolatis 2–4 unc. long. ¾–1¾ unc. latis, ovario 5 (v. 4 v. 3)-loculari, paniculis plerumque ½–1¼ unc.—*G. citrifolia*, Ldl. in Hort. Soc. Journ. i. 72.—*G. heterophylla*, A. Rich. in Sagra, Hist. Cuba; Bot. i. 231.—*G. americana*, Sagot. MS. in Hb. Benth.—*Limonia citrifolia*, Willd. Enum. 448; DC. Prod. i. 536.—*L. parviflora*, Bot. Mag. 2416. Forma occurrit foliis 1-foliolatis, 4–6 unc. long., 1¼–2½ lat.

Subvar. 3. (*macrophylla*). F. 3–5-foliolatis (foliolis 3½–6 unc.) v. 1-foliolatis (8–12 unc. long. 2¼–4 unc. lat.), disco crassiore ovario latiore.—*G. macrophylla*, Ldl. in Wall. Cat. 6377.

Subvar. 4 (*angustifolia*). Foliolis angustioribus lanceolatis 1½–3 unc. long. 4–8 lin. lat.—*G. angustifolia*, Ldl. in Wall. Cat. 6378.

Subvar. 5. Paniculis axill. brevissimis, constrictione inter ovarium et gynophorum inconspicua, stylo ovarium æquante.

Loc. Var. *a.* India bor.-occid.! *Edgeworth*; Kumaon! 2000 ped., *Strachey* & *Winterbottom*; Khasia! Assam! Rohilcund! *T. Thomson*; Kurg! Nilghiris! *Gardner*; Tavoy, *Helfer* & *Wall. Cat.* 6373; Bamo! *Hb. Griffith*; Mergui! *Griffith*; Pegu! *M'Clelland*; Ceylon! *Walker, Thwaites* (*C. P.* 180), prope Mangalore! *Pl. Hohen*, 393.

Subvar. 1. Canara et Mysore! *Law.*

Var. *β.* Madras, *Wight, Shuter*; Mysore, *Hb. Hook*; Ceylon! 6000 ped., *Walker*, 2–3000 ped., *Gardner, Thwaites* (*C. P.* 1192).

Subvar. 1. Assam! *Jenkins*; Khasia! *J. D. H.* & *T. T.*; Rangoon! *M'Clelland.*

Subvar. 2. Hong Kong! *Wilford, Wright*; Philippines! *Cuming*;

Banjarmassing, Borneo! *Motley*; Java, *Horsfield*. (Ind. occid. et Guiana, *cult.*)

Subvar. 3. Penang! Tavoy! *Hb. Hk.*

Subvar. 4. sine loc. in *Hb. Wall.*

Subvar. 5. Silhet! *Wall. Hb.* 6374; Khasia,! 1–4000 ped., *J. D. H. & T. T., Griffith.*; Chittagong et Cachar! *J. D. H. & T. T.*; Sikkim! 4-7000 ped., *J. D. Hook.*

The extreme forms of this most protean species are so dissimilar, that were they not united by almost all gradations, I should not have dreamt of uniting them. The collection of specimens illustrating these forms in the Kew Herbaria is very large, enabling me to dissect and compare a great amount of material. Roxburgh himself observes ('Pl. Coromandel,' i. 60) that the chief difference between his *L. arborea* and the *L. pentaphylla* of Retzius consists in the serrated leaves of the former. I certainly do not find any important character in the margination of the leaves authorizing me to separate them. The secondary veins and general venation are more decidedly marked in var. *a* than in var. *β*, and the leaves are, perhaps, less coriaceous in texture; but in subvar. *Chinensis* we have the leaves of the former with the pistil of the latter. I am not sure if the two forms figured by Roxburgh (Cor. Pl. i.) answer to my two races or are both referable to one. Mr. Thwaites, who has most obligingly favoured me with his valuable opinion on some of the important changes which I have proposed in this essay, is of the opinion that the *G. arborea* and *G. pentaphylla* of his 'Enumeratio' may be safely united. The differential characters to which he called attention in that work he does not find so constant as he had believed them to be.

2. G. BILOCULARIS, *Thwaites, En. Pl. Zeyl.* 45. Foliis 3–5-foliolatis, ovario biloculari glabro in disco incrassato brevi imposito.

Loc. Ceylon! (Maturatte District), *Thwaites* (*C. P.* 3362).

Frutex. (fide Thw. l. c.). *Foliola* lanceolata v. anguste trapezoideo-lanceolata, leviter acuminata, apice obtusa, subtus pallidiora, $1\frac{3}{4}$–$2\frac{1}{2}$ unc. longa, 5–8 lin. lata. *Panicula* axillaris, brevissima, pauciflora. *Calyx* lobis late ovatis v. triangulari-ovatis. *Petala* oblonga v. elliptico-oblonga. *Stamina* alterna breviora,—fide *Thwaites* 'multum et irregulariter dilatata;' antheris parvis, cordatis. *Discus* brevis, crassus, ovario paulo latior.

Of this species I have seen but a specimen in the British Museum Herbarium, and a small one which Mr. Thwaites kindly sent me with a letter. It appears a distinct species. The axillary inflorescences are extremely reduced, in my specimen hardly $\frac{1}{4}$ in. in length. The leaflets are also small.

3. G. SAPINDOIDES, *Lindley in Wall. Cat.* Foliis 5–7-foliolatis, paniculis racemosis nisi a basi vix ramosis, ovario 2 (v. interdum 3)-loculari, ferrugineo-piloso, stylo crasso subæquilongo.

Loc. Penang! *Wall. Cat.* 6376; Java! *Horsfield*! (var.? Australia bor.-occid.! *A. Cunningham in Hb. Hook.*).

Rami teretes, glabri. *Folia* 10–15 poll. *Foliola* lanceolata v. oblonga, leviter acuminata, 3–8 unc. longa, 1½–2½ unc. lata. *Flores* brevissime pedicellati v. sessiles. Paniculis v.- racemis cymosis parvis, 1–2 unc. in axillis foliorum superiorum quasi terminalibus. *Calyx* lobis ovato-rotundatis. *Petala* oblonga v.anguste oblonga. *Discus* parvus, vix ullus. *Ovarium* brevissime stipitatum. *Stylus* crassus, ovario fere æquilongus.

The panicles are branched only or chiefly near the base; the few flowers being disposed in very small, almost sessile glomerules, or singly on the branches of the inflorescence.

There is another *Glycosmis* in Dr. Horsfield's collection, probably allied to this plant, but I have had imperfect material for examination. The leaves are trifoliate, leaflets 6–9 ins. by 2–3 ins. The petals are linear oblong and ovary glabrous.

4. G. PUBERULA, *Lindley in Wall. Cat.* Foliis sæpius 3-foliolatis, ovario 5- v. 4-loculari brevissime stipitato oblongo ferrugineo-piloso.

Loc. Penang! *Wall. Cat.* 6375.

Foliola 2–4 unc. longa, ¾–1½ lata. *Pedicelli* brevissimi v. 0-1½ lin. longi. *Discus* parvus ad stipitem adnatus. *Stylus* brevissimus.

An var. *G. pentaphylla*, cui valde proxima, differt præcipue ovario piloso.

(G.? AFRICANA, *Hk. fil. Flora Nigrit.* 256. As observed above (p. 11) the only specimen which I have seen is so imperfect that I cannot tell whether it is truly a *Glycosmis* or not.

In Sir William Hooker's Herbarium there is a doubtful *Glycosmis* from S. Borneo, sent by the late Mr. Motley; it is not sufficient for description, but the elongated flowering axes look rather peculiar. I think it may be a variety of *G. pentaphylla*, allied perhaps to the Chinese form of that species.)

7. MICROMELUM *Blume*, '*Bijdragen*,' i. 137.

Calyx 5-dentatus v. triangulari-lobulatus v. integer. *Petala* 5, libera, crassiuscula, æstivatione (marginibus sæpe oblique) valvata, v. vix imbricata. *Stamina* 10, libera, alterna breviora; filamentis lineari-subulatis (v. linearibus apice subulatis). *Ovarium* toro brevissimo insidens, 5–4–3 (rar. 6–7–2)-loculare, dissepimentis prima baccæ maturitate sæpius plus minus spiraliter contortis. *Ovula* in loculis geminata superimposita. *Stylus* basi minute constrictus v. articulatus, mox sejungens. *Stigma* obtusum, subcapitatum v. capitatum. *Bacca* exsucca 1–2 (rariss. 3) -sperma. (*Embryonis M. pubescentis cotyledones* foliaceæ, intortuplicatæ; *radicula* longiuscula conspicua.) *Arbores* v. *subarbores* inermes; foliis pinnatis; inflorescentia terminali cymosim corymbosa, multiflora.

1. M. pubescens, *Bl. l. c.* Foliolis 9 15–21, calyce cupulato integro v. 5-lobulato, ovario 5 (in var. 4-3-2) -loculari plus minus piloso, stigmate stylo paulo latiore capitato.

Var. *α*. Foliolis 2½–3½ unc. longis 1–1½ unc. latis, calyce fere integro, stylo ovarium sæpius æquante v. paululo excedente.—*Cookia punctata*, Hassk. Cat. Hort. Bog. alt. p. 215; Miq. Fl. Ned. Ind. i. pt. 2, 524.—*Bergera villosa*, Wall. Cat. 6372.

Var. *β*. Foliis sæpe 12–20 unc. longis, foliolis 3½–6 unc. longis 1½–2 unc. latis, cymis corymbosis latioribus, floribus majoribus, calyce triangulari-lobulato.—*Bergera integerrima*, Roxb. Fl. Ind. ii. 376; DC. Prod. i. 537.—*B. villosa* (*forma pubescens*), Wall. Cat. 6372.

Var. *γ*. Foliolis angustioribus 1½–3½ unc. longis. ½–1½ latis, calyce lobulato, stylo sæpius ovarium excedente.

(Var. *δ*. (*glabrescens*). Foliolis pro ratione latioribus sæpius 1½–3½ unc. longis 1–2¼ latis, floribus parvis, calyce lobato-dentato, ovario 5-4-3-2-loculari.—*Micromelum glabrescens*, Benth. Lond. Journ. Bot. ii. 212.—*Limonia minuta*, Forst. Prod. n. 190.—*Glycosmis subvelutina*, F. Muell. Frag. Phyt. Aust. i. 25.)

Loc. α. Java! *Spanoghe, Lobb & Zollinger in Hb. Hook.*; Penang! *Wall. Cat.* 8517; Sunda Straits, *Staunton*, Hb. Mus. Brit.; forma *pubescens*, Philippines, *Cuming, Hb. Hook.*

β. Sikkim! 2–4000 ped., *J. D. H.*; Assam! Napalia infer.! *Wall. Cat.* 8518; (*pubescens*) In ripa Saluen fl.! *Hb. Wall.*

γ. Ins. Ceylon! *Walker*, 1600 ped.; *Gardner*, No. 108; *Thwaites* (*C. P.* 188).

(*δ*. Friendly Islands! *Barclay & Harvey*; Fiji! *Milne*; N. Caledonia, *Anders., Hb. Mus. Brit.*; Barnard ins.! *M'Gillivray*; Wide Bay, East-subtropical Australia! *Bidwill.*; Trop. Austr., *Cunningham*; Port Essington! *Hb. Hook.*; Cape Upstart! *M'Gillivray*; Albany and Cairncross Islands! *Mueller*; subvar. *velutina*, Burdekin River! *Mueller.*)

Arbor. v. *Arbuscula.* *Foliola* ovato-lanceolata, ovata, v. lanceolata, basi nunc subangustata nunc oblique fere cordata, leviter acuminata, apice obtusa, v. obtusiuscula, supra glabra v. glabrescentia, subter plus minus pubescentia, interdum utrinque pubescentia. *Pedicelli* sæpius circa 1 lin. longi v. breviores v. (in var. *β*.) nonnunquam longiores. *Calyx* cupulatus, 5-lobulatus v. subinteger. *Petala* anguste oblonga v. lanceolata, apice subacutata, utrinque plus minus pubescentia v. puberula. *Antheræ* rotundatæ, didymæ v. late elliptico-oblongæ. *Ovarium* pilosum v. subhirsutum, rarissime fere glabrum, normale 5 (variat. 4–3–6–7–2) -loculare. *Stylus* crassiusculus, ovario longior v. brevior, sursum glaber, denique abrupte sejungens. *Bacca* 1–2-sperma, glabra v. pubescens v. subvelutina.

2. M. hirsutum, sp. nov. Foliolis 15–23 basi valde inæquilateralibus, calyce parvo 5-triangulari-lobato, petalis extus hirsutis, ovario 5-loculari, stigmate stylo subæquilato.

Loc. Penang! *Wall. Cat.* 8516.

Folia 10–16 unc.; foliolis trapezoideo-lanceolatis v. ovato-lanceolatis, sæpe non parum acuminatis apice obtusiusculis, margine leviter denticulatis, supra sparse pilosis v. glabrescentibus, subter præcipue secus costam venulasque pilosis v. hirsutis. *Infloresceutia* cymosim divaricata, corymbosa v. subpaniculata, hirsuta. *Pedicelli* brevissimi. *Petala* anguste v. lineari-oblonga. *Bacca* jun. ovali-oblonga, hispida, breve et anguste stipitata.

Chiefly differing from *M. pubescens* in the long leaves with very numerous leaflets, small calyx, and petals strongly hairy externally.

[M. MOLLE, *Turczaninow in Moscow. Bull.* (1858), p. 380. Foliolis 10–13 utrinque plus minus pubescentibus, petalis 6 v. 5 patentibus v. reflexis, ovario glabro v. fere glabro, sæpissime 4-loculari.

Loc. Philippine Islands! *Cuming,* 1056. *Hb. Hook.*]

[M. TEPHROCARPUM, *Turcz. l. c.* Foliolis 9–21 glabris glabrescentibusve basi valde obliquis, ovario glabro 5-loculari.

Loc. Philippine Islands! *Cuming,* No. 597. *Hb. Hook.*

I am not sure if these two species of *Turczaninow* be specifically distinct. Probably they are, but I have seen but few specimens. In *M. tephrocarpum* the young berries are remarkably clothed with closely interwoven microscopic filaments of an ashy, glaucous grey colour (whence the name). I think this is probably due to some fungoid growth. The young ovaries being glabrous.]

8. PARAMIGNYA, *R. Wight. Illust. Ind. Bot.* i. 108.

Calyx 5 (v. 4) -lobulatus v. lobatus. *Petala* 5 (4), libera, æstivatione sæpius imbricata. *Stamina* 10 (v. 8 v. 12.), libera, æqualia v. subæqualia; filamentis linearibus; antheris lineari-oblongis. *Ovarium* in toro elevato, conspicuo, æquicrasso impositum, 5- v. 4- v. 3-loculare; ovulis solitariis v. geminatis, oblique superimpositis. *Stylus* elongatus, primum ovario continuus, denique basin versus sejungens. *Stigma* stylo latius, plus minus capitatum. *Bacca* 1–5-sperma. (*Semina* cotyledonibus carnosis, æqualibus.) *Frutices* sæpe scandentes, spinis axillaribus armati v. inermes. *Folia* 1-foliolata. *Flores* plerisque magnitudine fere citri, axillares, solitarii v. 3–4–8-fasciculati.

1. P. MONOPHYLLA, *Wt. l. c.* et tab. 42. Floribus solitariis v. 2-4-fasciculatis pedicellis excedentibus v. subæqualibus, calyce cupulato late 5-rotundato- v. quadrato-lobulato, staminibus 10 (v. 12), ovario 3-4–5-loculari, ovulis geminatis oblique superimpositis.

Loc. Prov. Sikkim! 2–5000 ped., *J. D. H.*; Khasia! *Hb. Griffith*; Concan! *Law, Stocks*; Ceylon! *Walker, Gardner, Thwaites* (*C. P.* 1202).

Var. Foliolis late ellipticis v. obovato-ellipticis, brevissime apiculatis. Moulmein! 5000 ped., *Lobb, Hb. Hook.*

Frutex scandens (fide Wight, l. c.), sæpius spinis axillaribus, recurvis, armatus; spinis nunc 8–10 lin. longis, nunc fere obsoletis. *Folia* 1-foliolata; foliolo cum lamina vix distincte articulâto, 5–10 (4–7) lin. longo; lamina elliptica, ovalis v. oblonga, sæpius breviter acuminata, interdum apice rotundato-obtusa, integra v. obsolete crenulata, glabra v. infra secus costam pubescentia, 2½–4 unc. longa.—*Pedicelli* 2–4 (-6) lin. longi. *Calyx* lobis integris v. marginatis retusisve. *Petala* oblonga, æstivatione valde imbricata. *Stamina* filamentis anguste linearibus, complanatis, glabris v. pilosis. *Ovarium* sæpe leviter sulcatum, pilosum v. fere glabrum; ovulis rarius solitariis, superiore lateraliter adfixo, inf. plus minus pendulo. *Stylus* sursum glaber. *Bacca* fide Wight, ovata sed ut mihi videtur pyriformis v. obovata, pubescens v. fere glabra. *Semina* compressa, testa membranacea. *Cotyledones* carnosæ, æquales.

2. P. GRANDIFLORA, *Wall. Cat.* Floribus sæpius solitariis pedunculis brevioribus v. æquilongis, calyce cupulato, rotundato-lobato, staminibus 10, ovario 5-loculari, ovulis (normale) solitariis v. interdum geminatis superimpositis.

Loc. Singapore! *Lobb. Hb. Helfer.* 925 & 83; Tavoy, *Wall. Cat.* 6361.

Ramuli breviter pilosi v. glabri, spinis axillaribus brevibus vix recurvis armati v. inermes. *Petiolus* supra medium articulatus, 3–6 lin. longus. *Foliolum* ovato-ellipticum v. oblongo-ellipticum, breviter acuminatum, apice obtusum, sparse pilosum v. glabrescens. *Pedunculi* 1–flori, pedicello articulati, 7–9 lin. longi. *Calyx* lobis integris vel emarginatis. *Petala* 5, oblanceolata, æstivatione valde imbricata. *Stamina* filamentis linearibus, apice abrupte et breve angustis, pilosis; antheris linearibus. *Ovarium* in toro fere æquilongo impositum, 5-loculare. *Stylus* infra pilosus. *Fruct.* non vidi.

3. P. CITRIFOLIA. Floribus 2–3-fasciculatis v. breve racemosis v. solitariis, pedicellis brevissimis calycem æquantibus vel paulo excedentibus, calyce 5-triangulari-lobato v. lobulato, ovario 5-loculari, ovulis geminatis superimpositis.—*Limonia citrifolia,* Roxb. Fl. Ind. ii. 379, et tab. Mus. (E.I.C.) 2243.—*Citrus scandens,* Griff. Notulæ iv. 495, ic. 587. 1.

Var. β. (*pubescens*). Foliolis oblongis subtus sparse pilosis, ovario piloso (*Limonia oblonga,* Wall. Cat. 6359 ?)*.

? Var. γ. (*Malaccensis*.). Pedicellis calycem excedentibus, æstivatione corollæ valvata.

Loc. Chittagong, *ex Roxb. l. c.*; Assam! *Hb. Hook.* Var. β. Mogoung, Birma! *Griffith.* Var. γ. Malacca! *Griffith.*

Frutex scandens spinis axillaribus brevibus recurvis armatus v. interdum spinis obsoletis. *Petiolus* lamina vix conspicue articulatus, 3–4 lin. longus. *Lamina* oblongo-elliptica, sæpius breviter et obtuse acumi-

* The specimen of this in *Hb. Wallich* is very bad.

nata, integra v. leviter undulato-crenulata, 3½–5 unc. longa, 1½–2¼ unc. lata. *Pedicelli* (in *a*) breves, 1–3 lin. longi. *Petala* æstivatione verisimiliter normali imbricata. *Stamina* 10. *Ovarium* glabrum v. pilosum. *Bacca* (fide Roxb. l. c.) ovata, 1–4 sperma.

4. P. ARMATA. Floribus nunc 3–4–8-fasciculatis nunc solitariis, pedicellis gracilibus, calyce leviter obtuse 5–4-triangulari-lobulato v. dentato-lobato, staminibus 8 (–10), ovario 3 (v. 4) -loculari, ovulis sæpissime solitariis.—*Arthromischus armatus,* Thw. En. Pl. Zeyl. p. 47.

Loc. Ceylon! alt. 6000 ped., *G. Thoms. in Hb. Hook., Gardner* (No. 110), *Thwaites* (*C. P.* 3115), *Macrae.*

Frutex (fide Thwaites, l. c.) scandens; spinis deflexis v. recurvis. *Petiolus* 2–5 lin. *Foliolum* ovato-oblongum v. lanceolatum, acuminatum, apice obtusum v. mucronulatum, glabrum v. secus costam minute puberulum, 1½–3 unc. longum, 8 lin.-1½ unc. lat.. *Pedicelli* 2½–4 lin. longi. *Calyx* parvus. *Petala* æstivatione valde imbricata. *Stamina* filamentis lineari-subulatis, pilosis; antheris lineari-oblongis. *Ovarium* pilosum. *Fructus* (fide Thw. l. c.) "rotundatus, flavescens, 4–8 lin. in diametro "–" 1–4-spermus."

9. LUVUNGA, *Hamilton in Wall. Cat.* 6382.

Calyx cupulatus margine, 4–5 (6)-lobulatus v. fere integer. *Petala* 4 v. 5, libera, lineari-oblonga v. lanceolata, æstivatione imbricata. *Stamina* 8 v. 10, libera, æqualia v. subæqualia; filamentis lineari-subulatis v. infra plus minus in tubum v. irregulariter coalitis v. liberis; antheris linearibus v. lineari-oblongis. *Ovarium* in disco brevi elevato annulato-cupulato impositum, 3–4 (v. 2)-loculare; ovulis in loculis geminatis, oblique superimpositis. *Stylus* continuus, crassiusculus. *Stigma* capitatum. *Bacca* cortice crassa, 3-2–1-sperma. *Embryonis* cotyledones æquales, carnosæ, oblongæ. *Frutices* scandentes, glabri, sæpe spinis axillaribus armati. *Folia* trifoliolata. *Flores* in racemis v. fasciculis v. paniculis parvis cymosis, axillaribus.

1. L. SCANDENS, *Hb. Ham. ex Wall. Cat.* 6382. Foliolis lanceolatis v. oblongo-lanceolatis, calyce 4 (v. 5) ad marginem late rotundato- v. truncato-lobulato, filamentis in tubum plus minus coalitis, ovario 4- 3-loculari.—*Limonia scandens,* Roxb. Fl. Ind. ii. 380. et tabb. (Mus. E. I. C.) 1153, 2056.

Loc. Silhet! *Hb. Wall.* 6282, B.—Birma! *Griffith.*

Frutex glaber, spinis leviter recurvis armatus v. inermis. *Petiolus* 1–4 unc.; petioluli 1½–3 lin. longi. *Foliola* glabra, coriacea, sæpius plus minus acuminata, 3–10 unc. longa, 1½–2½ unc. lata. *Flores* in paniculis v. racemis cymosis, breve pedicellati, ped. 1–3 lin. longi. *Bacca* ovalis v. oblonga, primum apiculata (fide Roxb. l. c.), magnitudine ovi columbæ instar, quasi 3-lobulata, 1–3-sperma.

Specimens in the Hookerian Herbarium from Assam (*Jenkins*) and Malacca (*Griffith*) may belong to this or the following species.

2. L. ELEUTHERANDRA, *Dalzell, in Kew Misc.* ii. 258. Foliolis ellipticis v. obovatis, calycis lobulis truncatis, filamentis liberis, ovario 3 (v. 4) -loculari.—? *Triphasia sarmentosa*, Bl. Bijd. i. 132.

Var. β (*angustifolia*). Foliolis *L. scandentis*.

Loc. Bombay! *Dalzell*; (Concan!) *Stocks*. Var. β. Ceylon, *Walker, Thwaites* (*C. P.* 1195).

Frutex scandens, sæpe spinosus, spinis recurvis. *Petiolus* 1–4 unc., petioluli 1–3 lin. long. *Foliola* sæpius breviter apiculata, glabra, 3–6 unc. longa, 1–2 lata.

Mr. Thwaites states this species to have a tendency to become diœcious.

Luvunga Tavoyana, Ldl. in Wall. Cat. 6383, I cannot consider to be specifically distinct from this plant. It forms, indeed, a connecting link which may warrant the union of the Indian forms under one species. It is apparently a larger plant with oblong-elliptical leaflets, 4–8 ins. long, very shortly and obtusely apiculate, with a petiole of from 3–6 ins. The flowers in short fascicles, or panicles, ½ to 2 ins. long; the stamens free, or slightly united at the base, and the ovary 3- or 2-celled. It occurs both unarmed and with strong, recurved, axillary spines.

[*L. Motleyi*, sp. nov. Foliolis grandibus obovato-lanceolatis v. ovalibus, calyce margine leviter 5- triangulari-lobulato v. fere integro, staminibus 10 liberis, ovario 3- v. 4-loculari.

Loc. Banjarmassing, Borneo merid! *Motley in Hb. Hook.*

Rami (ex Sched. Motl.) viminei, glabri. *Petiolus* crassitie sæpe pennæ corvinæ, 10–12 unc. longus. *Petioluli* interdum 8–10 lin. longi. *Foliola* integra v. obsolete undulato-crenata, 9–18 unc. longa, 4–6 unc. lata. *Flores* in cymis densis, depressis, axillaribus, breve pedicellati.

Differs chiefly from *L. eleutherandra* in the large size of the leaves; the calyx and corolla seem pentamerous. In the two preceding species they are probably normally tetramerous.]

There is another *Luvunga* sent to Sir W. J. Hooker by the late Mr. Motley from S. Borneo, which may be distinct. The corollas are fallen. The calyx appears unusually small and scarcely cupulate. The ovary 2- or 3-locular, with geminate, superimposed ovules.

10. FERONIA, *Correa in Linn. Trans.* v. 224; *DC. Prod.* i. 538.

1. *F. Elephantum*, Corr. l. c. 223; DC. l. c. 538.

In Peninsula et in Himalaya Tropica. Ins. Java! *Horsfield, Zollinger & Blume.*

F. pellucida, Roth. Nov. Pl. Sp. 384, is unknown to me.

11. ÆGLE. *Correa, l. c.* p. 222; *DC. Prod.* i. 538.

1. Æ. MARMELOS, *Corr. l. c.* p. 223; *DC. l. c.*—? *Æ. sepiaria*, Bl. Bijd. i. 140.

In Peninsula et in Himalaya tropica! Ins. Java! *Horsfield.*

Notes on *Menispermaceæ*. By George Bentham, V.P.L.S.

[Read March 7th, 1861.]

In the *Menispermaceæ*, as in the *Anonaceæ*, Hooker and Thomson have left but little to be done with regard to the Asiatic genera, until we shall have more satisfactory materials. The constant unisexuality of these plants, the difficulty of matching the male and female specimens even when we possess both, the great differences occasionally observed in the ripe fruit and seeds of species which are almost identical in their male flowers, are great obstacles to the proper classification of the order from herbarium specimens. It is indeed often impossible to identify species or genera which have been established on the examination of one sex only. And this is peculiarly the case with the South American *Menispermaceæ*, which have been so much mismatched, even by the experienced hand of Miers, that we have been obliged to reject amongst doubtful and indeterminable genera most of those of which one sex only, or the fruit without the flowers, have been described.

Before entering into any generic details I would advert, in a few words, to the so-called opposition of the stamens to the petals in *Menispermaceæ* and *Berberideæ*, as compared to that observed in *Buettneriaceæ*, *Rhamneæ*, *Ampelideæ*, *Myrsineæ*, *Primulaceæ*, etc., which is only apparent in the former case, more real in the latter. In the trimerous, dimerous, or rarely tetramerous *Menispermaceæ* and *Berberideæ*, the petals and stamens each usually consist of two distinct whorls—the outer stamens opposite to the outer petals, the inner stamens opposite to the inner petals—and consequently those of each whorl alternate with those of the whorl immediately below them, precisely as in the great mass of flowering plants. In the *Primulaceæ*, *Rhamneæ*, and other usually 5-merous or 4-merous families above mentioned, the opposition of the stamens to the petals seems to be more real, both being in single whorls, and suggesting in some cases (e. g. *Primulaceæ*) the suppression of an intermediate whorl, or perhaps in others (e. g. *Rhamneæ*), giving the idea of a common origin, as it were, of the petal and its opposite stamen; the latter being perhaps developed in the axil of the former, rather than produced from it by a so-called *dédoublement*, as supposed by A. Gray.

Before Miers published his outline sketch of the genera of *Menispermaceæ*, the South American species of the order had been

by most authors referred either to *Cissampelos* or to *Cocculus*. The former genus is so easily recognized in its male flowers, as well as in the female flowers or fruit, that it remains almost undisturbed within its own limits, although much reduced as to species; for Hooker and Thomson have shown that one tropical plant, common to the three great continents, has so wide a range and appears so variable in the fragmentary state we often find it in our collections, that it represents nearly half the published species of the genus. With regard to the *Cocculi*, Miers has pointed out differences in the structure of the seed, which, although not always accompanied by tangible differences in the male flowers, appear to be too important to be neglected in the circumscription of genera; and it is probable that, when better known, the group so characterized may be recognized by habit or other peculiarities. The same author had, however, unfortunately referred a ripe fruiting specimen of *Cocculus domingensis*, DC., to flowering specimens of *Abuta*, instead of to those of *Hyperbœna*; and Grisebach, in attempting to clear up this confusion, whilst he well distinguished *Abuta* in a note published in v. iii. p. 108 of this Journal, has, in his 'West Indian Flora,' overlooked the fact that the fruit of both the species he retains in *Cocculus* had been sufficiently described by Miers or by Poeppig, to be removed from that genus as characterized by him. Again, a female specimen in Seemann's collection referred (Bot. Her. p. 76) to a male *Abuta* (although with hesitation on Miers' part) as the *Batschia racemosa* of Thunberg, proves to belong to a very different natural order, and Triana, from some memoranda in the Hookerian Herbarium, does not admit that even Seemann's male specimen is that of Thunberg's *Batschia*, which he recognizes in a different-looking female specimen of his own, deposited in the same herbarium. To me, however, it appears that Seemann's male and Triana's female belong to one species of *Abuta*, and that, as far as we can judge from descriptions, *Batschia racemosa*, Thunb. is the same.

The American tropical cocculoid Menispermaceæ, sufficiently known to be generically determined, may be classed as follows:—

1. Chondodendron, *Ruiz et Pav.* Habit, inflorescence, straight fruit and albuminous seed of *Tinospora*, but with monadelphous stamens.

2. Anomospermum, *Miers.* Petals succulent, forming a flat triangular, areolated disk, each compartment enclosing its stamen. Fruit and seed straight. Albumen very much ruminate.

3. Abuta, *Aubl.* Petalless flowers, horseshoe seeds with a very

much ruminated albumen, as characterized by Grisebach in the abovementioned note.

4. COCCULUS, *Linn.*, as now limited, with small petals, free stamens, horseshoe seeds, and entire albumen.

5. HYPERBÆNA, *Miers*, with *Cocculus* flowers and horseshoe seeds, but a thick, fleshy embryo without albumen.

6. BOTRYOPSIS, *Miers*, with the fruit and seed of *Hyperbæna*; but a very different habit, an increase in the number of sepals, and long inflected points to the anthers.

7. SCIADOTÆNIA, *Miers*, with the seeds of *Hyperbæna*, but the carpels raised on long pedicels as in *Tiliacora*; the male flowers as yet unknown.

CHONDODENDRON, *Ruiz et Pav.*

Although the seeds in this American genus have only been seen by Poeppig, and although his description is very imperfect and his figure rude, there seems no reason to doubt that they are similar to those of the Asiatic *Tinospora*, from which there is little to distinguish it besides the monadelphous stamens. Miers mentions 8 species, but, judging from our specimens, I can find no character to separate the *C. convolvulaceum*, Poepp., *C. hederæfolium*, Miers, and *C. scabrum*, Miers, from the original *C. tomentosum*, R. et P. The form of the leaves will vary on the same specimen from quite entire and cordate with a deep narrow sinus, to broadly and openly cordate and more or less hastately 3-lobed. They are always more or less pubescent underneath, sometimes densely and softly so, and rough on the upper side with a very minute pubescence. The species is widely spread in Brazil, Guiana, and the eastern side of the Peruvian Andes. It is also Spruce's n. 3567, from the banks of the Guainia or Upper Rio Negro in Venezuela, where it establishes itself in places once cultivated. The *C. tamoides*, Miers (*Cocculus tamoides*, DC. Syst. Veg. v. i. p. 521), has the same diversity in the form of the leaves; but they appear to be perfectly glabrous. I have only seen it from Cayenne and British Guiana.

ANOMOSPERMUM, *Miers.*

Miers proposes three species of this genus which is very peculiar in habit and character; but on comparing a considerable number of specimens, I am unable to separate them into distinct varieties. The *A. Hostmanni*, Miers, has indeed rather smaller

and more coriaceous leaves with less prominent veins than the original specimens of his *A. Schomburgkii*; but others again, both of Schomburgk's later collections and of Spruce's, connect them too gradually to keep them any longer distinct. I have not seen the *A. nitidum*, Miers, from the Organ Mountains, but Sello's specimens from the same province of Rio Janeiro are in no manner to be distinguished from *A. Schomburgkii*, except in the somewhat larger size of the leaves. The following is a short description of the species:—

A. SCHOMBURGKII, *Miers* (*A. Hostmanni*, Miers, an etiam *A. nitidum* Miers?). Scandens, glabrum v. ramulis inflorescentiisque minute puberulis. Folia petiolata, oblonga, obtuse acuminata, 2–4-pollicaria, rigide coriacea, nitida, basi tenuiter 3-nervia, pennivenia et reticulato-venulosa, venis tamen omnibus tenuibus et interdum parum conspicuis. Pedunculi solitarii v. superposite 2–3-ni, 1–3-flori, 3–6 lin. longi, nunc supra-axillares, nunc in racemos axillares laxos, plus minus elongatos dispositi. Alabastra globosa, circa 2 lin. diametro; flores aperti circa 4 lin., albidi v. pallide flavicantes. Sepala 6; 3 exteriora parva, cordata, 3 interiora multo majora, orbiculata. Petala 6, sepalis multo breviora, crasso-carnosa, stamina singulatim involventia, in discum planum triangularem, 6-areolatum conferta. Fl. ♂, stamina 6 petalis longiora, antherarum loculis versus apicem divergentibus. Fl. ♀, stamina 6, sterilia. Carpella 3. Stigmata ovata, patentia. Drupæ ovoideo-oblongæ, styli cicatrice terminatæ. Putamen rectum, endocarpio ad ventrem in laminam verticalem membranaceam introrso. Semen oblongum, ad faciem interiorem sulcatum, laminam endocarpii fovens. Albumen laminis horizontalibus ruminatum. Embryo tereti-compressus, albuminis fere longitudine, rectus. Radicula supera. cotyledonibus appressis.

Hab. British Guiana (near Pirara), *Rob. Schomburgk*, 1st coll. n. 833, 2nd coll. n. 891; *Rich. Schomburgk*, n. 1499; Surinam, *Hostmann*, n. 1298; on the Rio Uaupès in N. Brazil, *R. Spruce*, n. 2563; in the province of Rio Janeiro, *Sello*.

ABUTA, *Aubl.*

I have already alluded to the confusion which has arisen in this genus from the mismatching male and female specimens, and which still prevails as to the limitation of the species. Grisebach mentions two as occupying each a wide geographical area. Our herbaria appear to comprise four or five, and it is probable that there are some others amongst the Brazilian *Cocculi* shortly described in Martius's 'Herbarium Floræ Brasiliensis.' The following are those

which belong to numbered or named collections in the Kew Herbaria*.

1. *A. concolor*, Poepp., as limited by Grisebach (the inflorescences as well as the rest of the plant are always perfectly glabrous). *Anelasma Guianensis*, Miers,—British Guiana, *Rob. Schomburgk*, 2nd coll. n. 440, *Rich. Schomburgk*, n. 696; Cayenne, *Martin*.—*Anelasma laurifolia*, Sagot, pl. exs. n. 20, from Cayenne.—*Anelasma Spruceana*, Miers, in Kew Journ. Bot. v. iii. p. 116, North Brazil, *Spruce*—viz. opposite the Isle of Marimahituba on the Amazon, n. 402, near Barra do Rio Negro, n. 1415; in the forest and capoeiras near Barra, n. 1829; at the falls of San Gabriel on the Rio Negro, n. 2192, on rocks near the cataract of Panurè on the Rio Uaupès, n. 2763 (described sometimes as a climber, sometimes as a shrub with weak but not climbing branches).—*Anelasma Gardneriana*, Miers, in dry woods near Nativitade, province of Goyaz in Brazil, *Gardner*, n. 3567 (described as a small tree).

2. A closely allied species, or perhaps a variety of *A. concolor*—*Batschia conferta*, Thunb., according to Miers in Seem. Bot. Her. p. 76, from the Bay of Ardita, Isthmus of Panama (small specimens, the supposed females with opposite leaves belong to a *Strychnos*).—*Batschia racemosa*, Thunb., according to Triana, from Mariquita in New Grenada (female specimens).

3. A large stout species with very coriaceous leaves, glabrous as in *A. concolor*, but broader and the inflorescence hoary; North Brazil, *Spruce*; in the forest near Barra, n. 1416, and in the gapò of an *igarapè* or creek of the Rio Negro near San Gabriel, n. 2393.

4. A glabrous species like *A. concolor*, but with much narrower and smaller leaves—*Anelasma Sellowiana*, Miers—Brazil, *Sello*.

5. *A. rufescens*, Aubl., according to Grisebach; Cayenne, *Sagot*; North Brazil, *Spruce*; in the forest near Barra, n. 1251, and in the capoeiras near San Gabriel, n. 2346.

Cocculus, DC.

Cocculus proper, as limited by Hooker and Thomson, contains, besides the five Indian species enumerated in their flora, two American species, *C. carolinianus*, DC., from the Southern United States, and *C. oblongifolius*, DC., apparently a common Mexican plant (Berlandier, n. 2300, Coulter, n. 657 and 1656, Galeotti, n.

* In Grisebach's note on Abuta above alluded to, several clerical or typographical errors occur in the Sprucean numbers quoted, and they are therefore here repeated.

1536), and two Chinese ones, *C. ovalifolius*, DC., Benth. Fl. Hongk. p. 13, from south China, and the following unpublished species.

C. CUNEATUS, sp. n. Foliis cuneato-oblongis apice retusis emarginatis v. obcordatis coriaceis nitidis venosis, cymis racemisve paucifloris folio brevioribus.—Rami tenues, pubescentes; folia breviter petiolata, 1–2 poll. longa, prope apicem ½–1 poll. lata, usque ad basin longe angustata, basi trinervia, cæterum reticulato-pennivenia. Pedunculi plerique tenues, pubescentes, 3–6 lin. longi, cymulam parvam ferentes, nonnulli in racemos elongantur 1–1¼-pollicares, cymulas plures ferentes brevissime pedicellatas. Sepala 6, biseriata, valde imbricata, a bracteis exterioribus minimis 1–2, in sepala interiora late orbiculata, gradatim aucta. Petala 6, sepalis breviora, staminibus longiora, basi auriculata filamenta amplectentia, apice bifida. Stamina 6, libera; antheris 4-locularibus. Flores fœminei adhuc ignoti.

Hab. China, on the west coast of the island of Formosa, *Wilford.*

HYPERBÆNA, *Miers.*

Of this genus our herbaria contain the three following species, which appear to me to be distinct, although with so much general resemblance to each other that Grisebach unites them all under *Cocculus domingensis*.

1. H. DOMINGENSIS. Ramulis glabris, foliis ovalibus v. ovali-oblongis glabris tenuiter coriaceis minute crebreque reticulatis a basi 3–5-nervis (nervis lateralibus rarius cum costæ basi concretis), drupis obovato-rotundatis.—*Cocculus domingensis,* DC.; Griseb. Fl. Brit. W. Ind. p. 10.—*Anelasma jamaicensis,* Miers.

Hab. Jamaica, Dominica, Cuba (*Wright,* n. 23).

2. H. RETICULATA. Ramulis glabris puberulisve, foliis, oblongis v. elliptico-lanceolatis rigide coriaceis reticulato-penninerviis (nervis lateralibus baseos sæpe evanidis), drupis obovato-rotundatis.—*Cocculus reticulatus,* Mart. Herb. Fl. Bras. p. 284.

α. Racemis masculis gracilibus elongatis glabris v. puberulis.—*Hyperbæna mexicana,* et *H. Moricandi,* Miers.

Hab. Mexico, *Jurgensen,* n. 91; Jamaica, *Purdie*; on the Casiquiare in Venezuela, *R. Spruce,* n. 3167; at Ilheos in the province of Bahia, Brazil, *Blanchet,* n. 2346.

β. Racemis confertioribus pubescentibus villosisve.—*H. Hostmanni,* Miers.—*Anelasma? minutiflora,* Sagot, Fl. Gui. exs.

Hab. Surinam, *Hostmann,* n. 1050; Cayenne, *Sagot,* n. 833.

3. H. TWEEDII, *Miers.* Ramulis petiolisque fusco-ferrugineo-tomentosis, foliis ovali-oblongis obtusis tenuiter coriaceis reticulato-penniveniis obscure triplinerviis glabratis, floribus fœmineis cymosis glabris.

Hab. South Brazil, in woods near Portoalegre and on the Rio Grande do Sul, *Tweedie.*

Botryopsis, *Miers.*

The *Cocculus platyphylla*, A. de St. Hil., upon which this genus is founded, is certainly very distinct from other *Cocculi*, both in calyx and fruit. It appears to be widely spread in southern Brazil and is Spruce's n. 4474 from Tarapoto. The *Abuta? tomentosa* of Sagot's Cayenne plants, n. 19, is probably a second species; for it has the same multiplication of sepals, but the female flowers and fruit are as yet unknown.

Sciadotænia, *Miers.*

A genus founded on a specimen of Martin's from Cayenne, with long axillary peduncles, bearing each what at first sight appears to be a fruiting umbel, and is so described by Miers; but a more careful examination shows that each ray bears only a single carpel, that the scars of the perianth are round the base, not at the summit of the rays, and that these rays are not pedicels, but podocarps, more or less united at the base (in Martin's specimen), precisely as in *Tiliacora*, the supposed umbel of fruits being the result of a single flower. The unusual number of carpels, the peculiar inflorescence, and fleshy embryo without albumen, are, however, sufficient to characterize it as a distinct genus, independently of the flowers, which were entirely unknown. Since, however, these observations have been drawn up, I have received, in a most valuable set of Cayenne plants collected by Dr. Sagot, a specimen of the same species under the name of *Abuta? umbellata*, also in fruit, but with notes on, and a sketch of, the female flower, which entirely confirms the above views. The perianth is in 3 series of 3 each, of which the inner series is twice as large as the other, as in *Coscinium*. This proportion is quite exceptional in *Menispermaceæ*, if this perianth be considered as consisting of 3 sepals and 6 petals; for in all other genera the petals where present are shorter than the sepals. Perhaps it would be more in conformity with the general plan of the order to consider both *Coscinium* and *Sciadotænia* as apetalous; the perianth consisting, as in some *Abutæ*, of 3 rows of sepals, or of 2 rows of sepals with 2 or 3 external bracts. In Sagot's specimen the podocarps are more spreading than in Martin's, and scarcely united at the base; but it appears to belong to the same species, which may be thus described:—

Sciadotænia cayennensis. Scandens. Ramuli, petioli, et interdum venæ primariæ foliorum tomentoso-pubescentes vel demum glabrati.

Folia cæterum glabra, ovalia v. obovali-oblonga, acuminata, 4–5-pollicaria, basi cuneata et 3-nervia, nitidula, petiolo pollicari. Pedunculi fœminei axillares, 4–8-pollicares, flore unico terminali parvo. Perianthii segmenta (sepala?) 9, 3-seriata, seriei interioris duplo majora. Carpella 6–10, per anthesin fere sessilia, sericeo-pilosa, stylo setaceo terminata; matura reniformi-globosa, supra podocarpia elongata articulata, glabrescentia, podocarpiis 6–9 lin. longis, nunc erectis et basi coalitis, nunc magis patentibus et subliberis.

Hab. Cayenne, *Martin*; near Korouany, *Sagot*, n. 23.

In Australia only four *Menispermaceæ* are as yet known, two of them, *Pericampylus incanus*, Miers (*Cocculus Moorei*, F. Muell. Fragm. Phyt. Austr. i. 162), and *Stephania hernandiæfolia*, Walp. (*S. australis* and *S. Gaudichaudi*, A. Gray, Bot. Amer. Expl. Exped. v. i. pp. 37, 38; *Cocculus Hookerianus*, F. Muell. MSS.), are widely-spread Asiatic species. The other two are peculiar to Australia, viz. *Sarcopetalum Harveyanum*, F. Muell. Fl. Vict. p. 27, suppl. t. 3, and the following new *Tinospora*:—

Tinospora smilacina (*Cocculus smilacinus*, F. Muell. MS.), Scandens, glabra, ramulis subcarnosis. Folia ovata, basi profunda et late cordata, auriculis rotundatis, apice obtusa v. vix acuminata, 3–4 poll. longa, 5-nervia; venulis minoribus vix prominulis, petiolo subpollicari. Racemi fœminei simplices, pollicares; floribus parvis viridulis, pedicellis 1 lin. longis. Sepala 3 exteriora minima, triangularia, 3 interiora ovata, 1 lin. longa, patentia, tenuia. Petala dimidio breviora, obovata. Drupa oblonga, circa 3 lin. longa; flores masculi ignoti.

Hab. Plains of Promise in Eastern Australia, *D. Moore*. Nearly allied to the Asiatic *T. crispa*, but the leaves are rather differently shaped and the fruits much smaller.

Notes on *Tiliaceæ*. By George Bentham, V.P.L.S.

[Read March 7, 1861.]

The *Tiliaceæ* are universally admitted, as a natural order, connected with *Malvaceæ* and *Sterculiaceæ* by their valvate calyx, but differing in their indefinite free, or nearly free, stamens, and distinguished from *Bixaceæ* by their several-celled ovary with axile placentation. None of these characters are absolutely constant, but the exceptional cases are readily classed by a combination of accessory characters pointing out their affinity; and I have no alteration to suggest in the general position and limitation of the order. It has been usual to divide it into two suborders, *Tilieæ*

and *Elæocarpeæ*; the latter considered by some as a distinct order, founded on the notched or divided petals and the dehiscence of the anthers; whilst *Tilieæ* have been subdivided into two tribes, the *Sloanideæ* without petals, and the *Grewideæ* with petals. To me it appears, however, that *Sloanea* is much nearer allied to *Elæocarpus* than to *Grewia*; and it is probably under the same idea that Grisebach proposes to take the anthers as the primary character for the division of the order. But here, again, *Apeiba* and *Sloanea*, which are so different in other respects, are brought next to each other, and removed from other genera with which they appear to be generally much closer connected. If, however, we take the nature of the petals in the first instance, and secondly that of the stamens and calyx; and, following out the principle that governs the demarcation of the order, if we take neither of these characters as absolute, and admit of more or less exceptional genera, we have an apparently more natural distribution of the thirty-seven genera which we propose to adopt, into six tribes, grouped into two suborders.

The difference between these two suborders, to which we may give the names of *Holopetalæ* and *Heteropetalæ*, would then be in some measure analogous to that which we have established between *Bixaceæ* and *Samydaceæ*, but much less marked. In the *Holopetalæ* the petals are always present (except in one or two of the numerous species of *Grewia*); and, although sometimes small, they are of a true petaloid nature, entire or very slightly notched, glabrous, narrowed at the base, and deciduous. The stamens are decidedly hypogynous in all but *Muntingia*, inserted either on a small torus immediately within the petals, or on a raised torus, round the base of which are placed the petals. In the *Heteropetalæ* the petals, when present, are of a more or less calycine nature, often notched, fringed, or divided, hoary or pubescent outside, attached by a broad base and usually persistent, so as to have been sometimes described as inner calycine segments; and in some genera they are entirely absent, or present only in a very few species. The disk (usually covered with stamens quite to the ovary) is usually thick—in some genera so broad and flat as to appear perigynous, in others raised, bearing the stamens on the top, and surrounded by the petals at the base, very rarely small and hemispherical.

These two suborders would again be subdivided into six tribes, more or less natural, of which the *Holopetalæ* would comprise four.—1. *Brownlowieæ*, marked by a gamosepalous calyx, and

approaching near to some *Sterculiaceæ*; 2. *Grewieæ*, with free sepals, short anthers opening longitudinally, and the petals foveolate at the base, and inserted round the base of a raised torus, bearing the stamens on the top; 3. *Tilieæ*, with the sepals and anthers of *Grewieæ*, or the anthers rarely elongated, but still versatile, and the petals never foveolate at the base and inserted close round the stamens, which cover the small or flattened, but never raised torus; 4. *Apeibeæ* with free sepals, but remarkable for their erect linear anthers with the connective more or less prolonged into a membrane beyond the cells; their dehiscence is, however, by longitudinal slits, as in other *Holopetalæ*. In the *Heteropetalæ* we have two tribes: 5, *Prockieæ*, comprising three somewhat anomalous genera, with small globular or ovoid anthers opening longitudinally; and 6, *Elæocarpeæ*, with erect anthers usually linear, often prolonged into a point, and opening from the apex downwards in confluent pores or short slits, giving them often a 2-valved appearance. These *Elæocarpeæ* are again divisible into two subtribes—*Sloaneæ*, with a broad, flat or convex disk entirely covered with stamens; and *Euelæocarpeæ*, with the stamens on the top of a raised disk, round the base of which the petals are inserted as in *Grewieæ*.

The following synopsis will more clearly show the proposed distribution of the Tiliaceous genera:—

Subordo I. HOLOPETALÆ. *Petala* glabra, colorata, tenuia, basi contracta v. unguiculata, integra v. rarissime emarginata, decidua.

Tribus 1. BROWNLOWIEÆ. *Sepala* in calycem campanulatum, 3–5-fidum coalita. *Antheræ* subglobosæ v. didymæ, loculis demum confluentibus.

* *Stamina 5 interiora ananthera (staminodia).*

Genera:—1. Pentace, *Hassk.*; 2. Brownlowia, *Roxb.*; 3. Diplodiscus, *Turczan*; 4. Pityranthe, *Thw.*

** *Stamina omnia antherifera.*

Genera:—5. Christiania, *DC.*; 6. Berrya, *Roxb.* (*Hexagonotheca*, Turczan.).

Tribus 2. GREWIEÆ. *Sepala* distincta. *Petala* basi foveolata, circa basin tori elevati apice staminiferi inserta. *Antheræ* breves, loculis parallelis, distinctis.

* *Fructus inermis, glaber v. tomentosus.*

Genera:—7. Grewia, *Linn.* (*Microcos*, Linn.; *Vincentia*, Boj.; *Omphacarpus*, Korth.); 8. Columbia, *Pers.*; 9. Diplophractum, *Desf.*; 10. Belotia, *A. Rich.* (*Adenodiscus*, Turczan.).

** *Fructus echinatus v. setosus.*

Genera:—11. Erinocarpus, *Dalz.*; 12. Triumfetta, *Linn.*; 13. Heliocarpus, *Linn.*

Tribus 3. Tilieæ. *Sepala* distincta. *Petala* haud foveolata, circa stamina immediate inserta. *Antheræ* breves v. rarius elongatæ (et tum versatiles v. sagittatæ inappendiculatæ); loculis parallelis, distinctis.

* *Capsula loculicide dehiscens, echinata v. siliquæformis.*

Genera:—14. Entelea, *Br.*; 15. Sparmannia, *Thunb.*; 16. Clappertonia, *Meissn.* (*Honkenya*, Willd.); 17. Corchorus, *Linn.* (*Antichorus*, L. f.); 18. Corchoropsis, *Sieb. et Zucc.*

** *Capsula nuda, apice dehiscens.*

Genera:—19. Luhea, *Willd.* (*Alegria*, Moç. et Sess.); 20. Mollia, *Mart. et Zucc.*; 21. Trichospermum, *Blum.* (*Diclidocarpus*, A. Gray).

*** *Fructus indehiscens.*

Genera:—22. Muntingia, *Linn.*; 23. Tilia, *Linn.*; 24?. Leptonychia, *Turczan.*; 25. Schoutenia, *Korth.* (*Actinophora*, Wall.).

Tribus 4. Apeibeæ. *Sepala* distincta. *Petala* haud foveolata, circa stamina immediate inserta. *Antheræ* lineares, erectæ, ultra loculos membrana terminatæ. (*Ovarium* multiloculare. *Fructus* indehiscens v. ab axi deliquescens.)

Genera:—26. Glyphæa, *Hook. fil.*; 27. Apeiba, *Aubl.*

Subordo II. Heteropetalæ. *Petala* v. nulla, v. sepaloidea v. incisa, extus sæpissime pubescentia v. canescentia, et basi lata inserta, sæpe persistentia.

Tribus 5.—Prockieæ. *Antheræ* subglobosæ v. didymæ.

Genera:—28. Prockia, *Linn.* (*Trilix*, Linn. fil.; *Kellettia* Seem.); 29. Hasseltia, *H.B. et K.*; 30. Plagiopteron, *Griff.*,

Tribus 6. Elæocarpeæ. *Antheræ* lineares, apice dehiscentes.

Subtribus 1. Sloaneæ. *Discus* staminifer planus. *Sepala* et *petala* circa stamina immediate inserta.

Genera:—31. Sloanea, *Linn.* (*Ablania,* Aubl.; *Dasynema,* Schott; *Dasycarpus,* Œrst.); 32. Echinocarpus, *Blume*; 33. Ropalocarpus Boj.; 34. Vallea, *Linn. fil.*

Subtribus 2. Euelæocarpeæ. *Petala* circa basin tori elevati glandulosi apice staminiferi inserta.

Genera:—35. Tricuspidaria, *R. et. P.* (*Crinodendron,* Molin.); 36. Aristotelia, *Lher.* (*Friesia,* DC.); 37. Elæocarpus, *Linn.* (*Ganitrus,* Gærtn.; *Aceratium,* DC.; *Beuthea,* Endl.; *Monocera,* Jack.; *Diceros,* Forsk.).

Without pretending to have examined all the species of all these genera of which we have specimens, there are some, however, upon which I have a few remarks to give.

Brownlowia, *Roxb.*

The stellate pubescence, so common in *Tiliaceæ,* becomes sometimes in this genus scaly, and especially in the *B. lanceolata,* where the inflorescence is occasionally much reduced, and gives it almost the habit of some *Bombaceæ,* such as *Boschia,* Korth. (*Heteropyxis,* Griff.), to which, indeed, it comes nearer in other characters. The free stamens with single anthers, however, determine its place among *Tiliaceæ.* The genus is remarkable also for the seeds, which, as indicated by Roxburgh for the *B. elata,* and verified by myself in that species and in the *B. lanceolata,* have no albumen, the seed being entirely filled with the large embryo with thick fleshy cotyledons; whilst in all other *Tiliaceæ* where it is known, even in the otherwise closely allied genus *Pentace,* the albumen is copious and the cotyledons leafy.

Besides the original *B. elata,* Roxb., we have the two following new species of this genus:—

B. peltata. Foliis peltato-suborbiculatis demum glabratis; panicula ampla, terminali rufescenti-tomentella. Arbor parva. Rami floridi, crassi. Folium perfectum unicum vidi, excentrice peltatum, 8 poll. longum, 7 poll. latum, octonerve. Panicula divaricata *B. elatæ,* nisi amplior. Flores paulo minores, subsessiles, pallide rosei. Petala obliqua, undulata, basi in unguem brevem abrupte contracta. Filamenta interiora sterilia (seu staminodia), anguste linearia.

Hab. Banjarmassing, in Borneo, *Motley,* n. 1288.

The fruit is said to be eaten in curries. I have seen only a single specimen.

B. LANCEOLATA. Foliis lanceolatis suboblongisve coriaceis subtus lepidoto-incanis, paniculis axillaribus terminalibusque paucifloris folio brevioribus.—Arbor? Ramuli canescentes. Folia 4–6 poll. longa, 1–2 poll. lata, acuminata, basi obtusa, petiolo 2–3 lin. longo; novella utrinque canescentia, adulta supra glabra et nitida, subtus squamis minutis lepidotis omnino obtecta, penninervia et basi obscure 3-nervia. Paniculæ in axillis superioribus 1–2-pollicares et nonnunquam terminalis major, ramis tamen vix divaricatis. Calyces 2 lin. longi, uti pedicelli lepidoti. Petala paulo longiora, oblonga, basi parum contracta. Antherarum loculi ut in speciebus generibusque affinibus oppositi, divaricati, demum confluentes. Ovarium 4-lobum (3–5-lobum?). Carpella matura distincta, subglobosa, intus planiuscula, tomento appresso incana, ½ poll. diametro. Seminum testa tenuis, endocarpio adhærens. Albumen nullum. Cotyledones crassæ, subhemisphæricæ, apice retusæ. Radicula brevis, infera.

Hab. Moolmein, *Griffith*, *Parish*.

I have examined several specimens, both in flower and in fruit.

GREWIA, *Linn.*

This the largest genus of *Tiliaceæ*, after deducting a considerable number of untenable species described from insufficient specimens, or reducible to slight varieties, will still be found to comprise about 60 species, either published or deposited in our herbaria—all natives of the tropical or subtropical regions of the Old World, two or three extending northward of the tropic in Eastern Asia, and a few southward in Africa or Australia. The greater number have a 3- or 4-celled ovary, with 2 or 4 ovules in each cell, and a 2- to 4-lobed drupe, and these were originally considered as essential characters of the genus. Such species, therefore, as were occasionally observed to have numerous ovules or a 2-celled ovary, or a perfectly entire fruit, have been at different times proposed as distinct genera under the names of *Microcos* and *Vincentia* (altered by Steudel to *Viticena*), and another species has been separated by Korthals under the name of *Omphacarpus*, on account of the fibrous dry nature of the sarcocarp. All these peculiarities are, however, now found to be connected with the more prevalent forms by a chain of intermediate species, and these proposed genera have been reunited with *Grewia*. It is probable that, on a careful review of the whole genus, *Microcos* and *Vincentia* will both of them constitute natural sections, the latter including the South African as well as the Madagascar species. The Mexican

species, on the other hand, forming the genus *Belotia*, A. Rich., or *Adenodiscus*, Turczan., is probably quite distinct. The fruit is said to be capsular, with the seeds enveloped in long cottony hairs. Our specimens from various sources are all in flower only, so that we have been unable to verify this character; but we have no reason to doubt its accuracy.

Columbia, *Pers.*

Of this tropical Asiatic genus our herbaria contain five species, including the *Glossospermum quinquealatum*, Wall. Catal. n. 1154 and 7841. The *Columbia inæquilatera*, Turczan., is identical with *C. serratifolia*, DC.

Erinocarpus, *Dalz.*

A single species is known, which was published by Dalzell in the 'Hortus Bombaiensis' under the name of *E. Nimmoana*, which by some error has been converted by Hasskarl, in describing it in his 'Retzia,' into *E. Kaimoni*.

Luhea, *Willd.*

Of this beautiful South American genus Mr. Spruce's collections supply us with the two following new species, both very well marked:—

L. ALTHEÆFLORA, *Spruce*. Foliis coriaceis obovato-oblongis supra nitidis subtus ochraceo- v. canescenti-tomentosis, panicula densa, involucri foliolis sepalisque lanceolatis crassis rufo-tomentosis, petalis suborbiculatis, staminibus abbreviatis lana rufa involutis, staminibus antheriferis multo longioribus quam petala duplo brevioribus.—Arbor pulchra, 30-pedalis. Folia 6–10 poll. longa, 3–5 poll. lata, apice rotundata, basi subcordata. Paniculæ primariæ foliis subbreviores, in axillis superioribus dispositæ, paniculam formantes foliatam divaricatam. Pedicelli breves. Involucri foliola circa 9 lin. longa. Sepala paullo breviora. Petala fere pollicaria, purpurea. Staminum tubus brevis, annulatus, sterilia seu staminodia in annulum lanuginosum exteriorem coalita; fertilium filamenta 2–3 lin. longa. Antheræ oblongo-lineares, parvæ, basi bilobæ. Ovarium villosissimum. Ovula in loculis pauca. Stylus apice vix dilatatus.

Hab. In woods near San Carlos, on the Rio Negro, *Spruce*, n. 3484.

L. CYMULOSA, *Spruce*. Foliis oblique oblongis acuminatis supra nitidis subtus ochraceo-tomentellis, cymis folio multo brevioribus confertifloris, involucro subintegro caducissimo, sepalis cano-tomentosis, petalis lineari-cuneatis, staminibus pentadelphis paucis sterilibus vix

brevioribus.—Arbor magnitudine *Pyri Mali*. Folia 2–4 poll. longa, 1–1¼ poll. lata, supra medium denticulata v. integra, basi oblique subcordata. Cymæ florigeræ breves, fructiferæ 2 poll. diametro. Involucri bracteæ alabastrum juniorem involventes, mox hinc fissæ et longe ante anthesin deciduæ. Flores albi. Sepala lanceolata, vix semipollicaria. Petala paulo longiora, basi pubescentia. Stamina petalis breviora, ad tertiam partem pentadelpha et pubescentia, superne glabra; antheræ parvæ, oblongæ, versatiles. Ovarium villosissimum. Stylus glaber, superne valde dilatatus. Capsula circa 8 lin. longa, obovoidea, 5-angularis (fere 5-loba), pubescens, intus 5-locularis; septa spuria quarundam specierum desunt. Semina generis, alata, albumine parco; cotyledonibus ovatis, subcordatis; radicula iis dimidio breviore.

Hab. Frequent in the gapo of the Rio Negro and of the Solimoes, near their confluence, *R. Spruce*, n. 1594.

MOLLIA, *Mart.*

Mr. Spruce's collections have added the four following new species to the two already known of this genus:—

M. GRACILIS, *Spruce*. Foliis ovatis suboblongisve utrinque viridibus sparse substellato-lepidotis, sepalis lepidoto-incanis pedicello brevioribus.—Arbor tenuis, ramosa, 25-pedalis. Folia 2–4-pollicaria, ovalia, elliptica v. oblonga, breviter acuminata, apice obscure crenata, supra nitidula; axillæ venarum subtus barbatæ. Flores albi. Pedicelli pollicares. Sepala circa 9 lin. longa. Petala iis æquilonga, linearia. Ovarium lepidoto-tomentosum. Fructus non visus.

Hab. New Tarapoto, on the eastern side of the Andes of Peru, *R. Spruce*, n. 4949.

M. LONGIFOLIA, *Spruce*. Foliis oblongis integerrimis coriaceis supra glabris subtus sparse lepidotis, capsula apice integra.—Arbor 60-pedalis, radicibus emersis suffulta. Folia 5–7 poll. longa, concoloria v. subtus pallidiora. Flores mihi desunt. Pedicelli fructiferi pollicares. Capsula pollicaris, ala apicis coriacea-sublignosa, late rotundata, haud emarginata.

Hab. In the woods bordering the Rio Uaupes in North Brazil, *R. Spruce*, n. 2809.

M. LEPIDOTA, *Spruce*. Foliis ovatis suboblongisve coriaceis integerrimis supra sparse lepidotis subtus squamulis confertis argenteo-lepidotis, sepalis pedicello æquilongis.—Arbor nunc 15–20-pedalis, nunc 60–70 pedes attingens. Folia 3–5-pollicaria, plus minus acuminata, infra nitidula. Pedicelli nunc pollicares, fasciculati, nunc breviores pedunculo communi fulti. Flores albi. Sepala cano-tomentosa, pollicaria. Petala lineari-cuneata. Antheræ phalangium longiorum roseæ, brevi-

orum flavæ. Capsula orbiculata, apice breviter et obtusissime acuminata, ad margines coriaceo-attenuata at vix alata.

Hab. In the gapo of the Rio Negro in North Brazil, near the Lago de Alexâo, *R. Spruce,* n. 1591, and in the gapo of the Rio Uaupès, n. 2538 and 2576.

M. TOMENTOSA, *Spruce.* Foliis amplis ovatis acuminatis supra ad venas subtus undique pubescentibus, floribus fructibusque apice retusis rufo-villosis.—Arbor 25-pedalis. Folia 6–8-pollicaria, integerrima v. apicem versus remote dentata, subtus pube brevi haud densa rufescentia. Pedicelli fasciculati, pollicares, uti sepala (iis longiora) molliter rufo-villosi. Ovarium hirsutissimum. Capsula subpollicaris, apice angustissime alata, late rotundata, retusa nec emarginata.

Hab. In the gapo of the Rio Uaupès in North Brazil, near Panurè, *R. Spruce,* n. 2653.

TRICHOSPERMUM, *Blume.*

I have seen no specimens of Blume's species, but from the detailed character given by Clos in the 'Annales des Sciences Naturelles' (ser 4, v. viii. p. 265), I have no doubt that it is erroneously referred to *Bixaceæ,* and is a strict congener of, although not specifically identical with the *Diclidocarpus,* so well described and figured by A. Gray in the 'Botany of the American Exploring Expedition,' and of which I have examined specimens gathered in Feejee by Dr. Harvey. It has the fruit of *Mollia,* with very different flowers and seeds. Blume's name, having the right of priority, must of course prevail over A. Gray's.

GLYPHÆA, *Hook. fil.*

This genus, of which we have two west tropical African species, is remarkable for the close affinity in structure of its stamens, many-celled ovary, and indehiscent fruit, to those of the tropical American genus *Apeiba,* although the resemblance is disguised by differences in outward form and proportion more striking to the eye. The flowers in both genera are yellow.

APEIBA, *Aubl.*

The *A. Tibourbou,* Aubl., a very common Guivaa tree, was gathered also by Spruce in rocky places at Maypures, on the Orinoco, and distributed under n. 3625. He found it a tree of about forty feet. The membranous appendage of the anthers is shorter than the cells.

A. hypoleuca, Steud. in Flora, 1843. p. 735, from Surinam, *Hostmann,* n. 294, appears to be identical with the *A. Petoumo,* Aubl.

The following is new:—

A. MEMBRANACEA, *Spruce.* Foliis supra glabris subtus subcanescentibus, panicula laxa per anthesin ebracteata, antherarum membrana loculos 2–3-plo superante.—Fructus *A. asperæ*, a qua differt imprimis panicula ebracteata. Arbor est 25-pedalis, ramis longis, debilibus. Folia fere *A. asperæ* subtus plus minus canescentia v. pallide rufescentia. Flores lutei.

Hab. On the banks of the Cassiquiare in Venezuela, but sparingly, *R. Spruce*, n. 3204; near the Bodega de Remolina, in the province of Antioquia, New Grenada, *Purdie.*

PROCKIA, *P. Br.* (et *Linn.*)

The original *Prockia crucis*, Linn., variously associated by different authors with different species of *Bixaceæ*, has been again isolated by Bennett and referred by Clos to *Tiliaceæ*. This approximation has been confirmed by Seemann, who, in determining his specimens, recognizing in them all the characters of *Tiliaceæ*, did not think of searching in *Bixaceæ*, but described them as a new genus allied to *Sloanea*. Grisebach, however, in his recently published 'Flora of the British West Indies,' proposes to retain the plant in *Bixaceæ*, uniting it with *Banara* under the name of *Trilix*. In this I cannot agree with him; for whilst the habit and stipules of *Prockia* are quite as much Tiliaceous as Bixaceous, there is nothing in general character to prevail over the positive distinction of a completely divided ovary with axile placentation and hypogynous stamens in *Prockia*, from the 1-celled ovary with projecting parietal placentas and perigynous stamens of *Banara*. And with regard to the name, *Prockia* having been established by the elder Linnæus in his genera, must surely prevail over his son's more recent name of *Trilix*.

HASSELTIA, *H. B. et K.*

The perianth is usually described as a calyx with a double row of segments without petals. But in this case, as in *Banara*, *Homalium*, and other genera exhibiting an analogous structure, it appears to me more in conformity with established terminology to consider the outer valvate series alone as sepals, and the inner imbricate series as petals, notwithstanding their sepaloid aspect and persistence.

PLAGIOPTERON, *Griff.*

The opposite leaves, inflorescence, and numerous small flowers, give this plant a habit which does not at first view suggest a

Tiliaceous affinity, reminding one rather of some *Combretaceæ*; but the andrœcium, gynœcium, and fruit are quite Tiliaceous. Opposite leaves occur also in some species of *Sloanea*, *Elæocarpus*, &c., and the plan of inflorescence, although disguised, is essentially that of the majority of *Tiliaceæ*. The perianth is anomalous, appearing at first simple; but a careful examination shows minute external tooth-like segments, which are the true sepals; whilst the more conspicuous segments, although pubescent, sepaloid, and valvate, must be regarded as petals. An approach to a similar arrangement may be observed in *Tricuspidaria* and in those *Homalia*, in which the inner segments or petals enlarge much more than the outer ones or sepals.

Sloanea, *Linn.*

The investigation of the uncertain characters by which the genera *Ablania*, Aubl., *Dasynema*, Schott, and *Dasycarpus*, Oerst., have been distinguished from *Sloanea*, having obliged me to examine and analyse all the species of the group of which we have specimens, I have drawn up a general synopsis, which I now give, premising that not one of the proposed characters has appeared sufficient to establish even good sections; the best division of the genus that I could form being derived from inflorescence.

Series I. Paniculatæ.

Panicula terminalis corymbosa, folia superans. Antheræ lineares vix apiculatæ.

1. *S. corymbiflora*, DC. Foliis tenuiter coriaceis venulosis, sepalis membranaceis, alabastro oblongo.
2. *S. durissima*, Spruce. Foliis crasso-coriaceis nitidis, venulis inconspicuis, pedicellis incrassatis, sepalis crassis, alabastro ovoideo.
3. *S. laxiflora*, Spruce. Foliis tenuiter coriaceis venulosis, pedicellis vix incrassatis, sepalis crassis, alabastro ovoideo.
4. *S. paniculata*, Spruce. Foliis crasso-coriaceis nitidis basi cordatis, sepalis brevibus crassis, alabastro subgloboso.

Series II. Corymbulosæ.

Pedunculi axillares, apice corymboso-paniculati, foliis (amplis) breviores.

5. *S. synandra*, Spruce. Sepalis crassis 9–10 lin. longis, antheris vix apiculatis subcohærentibus.

6. *S. Schomburgkii*, Benth. Sepalis crassis 6 lin. longis, antheris vix apiculatis.

7. *S. floribunda*, Spruce. Sepalis 4 lin. longis acuminatis, antheris tenuiter acuminatis.

Series III. Axilliflorææ.

Pedunculi axillares racemoso-pluriflori v. rarius 1-flori.

§ 1. Stipulatæ, ***stipulis bracteisque persistentibus.*** (***Folia ampla.***)

* *Antheræ lineares acumine brevi.*

8. *S. dentata*, Linn. Foliis glabris, stipulis latis, racemis canescenti-tomentosis, calyce cyathiformi truncato 8–10-dentato.

9. *S. macrophylla*, Spruce. Foliis glabris, stipulis lanceolatis, racemis canescenti-tomentosis petiolo brevioribus, calyce 4–6-partito.

** *Antheræ oblongæ acumine longo.*

10. *S. pubiflora*, Planch et Lind. Foliis glabris, stipulis angustis, racemis molliter cano-pubescentibus petiolo longioribus, calyce 4–6-partito staminibus longiore.

11. *S. rufa*, Planch. Foliis subtus rufo-villosis, stipulis latis dentatis.

12. *S. Massoni*, Sw. Foliis glabris, stipulis linearibus, racemis pubescentibus, calyce 5–6-partito staminibus breviore.

§ 2. Brachystachyæ, ***stipulis obsoletis v. caducis, racemis axillaribus brevibus.***

* ***Antheris brevibus glabris v. vix puberulis, muticis v. brevissime apiculatis, capsulis echinatis.***

13. *S. obtusa*, Planch. Foliis obovatis 2–3-pollicaribus glabris, racemis laxe paucifloris, staminibus canescentibus, antheris subglobosis muticis.

14. *S. parviflora*, Planch. Foliis obovato-oblongis 4-6-pollicaribus glabris, floribus parvis confertis tomentosis, staminibus longe exsertis glabris, antheris breviter oblongis muticis.

15. *S. sinemariensis*, Aubl. Foliis ovatis obovatis oblongisve 4–12-pollicaribus glabris, racemis laxiusculis, antheris exsertis subglabris, apiculo brevi, filamentis hirtis.

16. *S. brevipes*, Benth. Foliis subtus rufo-pubescentibus, antheris puberulis, filamentis hirtis.

** *Antheris oblongis v. linearibus, uti filamenta hirtellis, calyce longioribus anguste apiculatis, capsulis rigide setosis.*

17. *S. stipitata*, Spruce. Foliis amplis lato-ovatis grosse dentatis, capsula stipitata.

18. *S. pubescens*, Benth. Foliis amplis ovatis plerisque dentatis subtus pubescentibus, inflorescentia laxa, capsula sessili.

19. *S. cuneifolia*, Mart. Foliis (circa 6-poll.) ovali-oblongis acuminatis integris glabris, petiolo pollicari, racemis brevibus subcorymbosis, capsula sessili.

20. *S. microcarpa*, Planch. Foliis *S. cuneifoliæ* nisi petiolo 1–4-lineari, floribus fructuque *S. guianensis.*

21. *S. guianensis*, Benth. Foliis 2–4-pollicaribus acuminatis, petiolo 6–9-lineari, racemis petiolo longioribus paucifloris.

22. *S. alnifolia*, Mart. Foliis 2–4-pollicaribus obtusis subrepandis, racemis petiolo brevioribus.

*** *Antheris pubescentibus, breviter apiculatis, calyce brevioribus v. vix longioribus, capsulæ setis densissimis mollibus hirtellis v. ad tomentum dense velutinum reductis.*

† *Foliis valde venosis acuminatis, racemis cano-puberibus.*

23. *S. riparia*, Gardn. Foliis glabris, petiolo 3–6-lin. longo, ovario deflorato obovoideo-subgloboso.

24. *S. monosperma*, Vell. Foliis glabris, petiolo brevissimo, ovario deflorato pyramidato-tetragono.

25. *S. hirsuta*, Planch. Foliis subtus pubescentibus, petiolo brevissimo.

†† *Foliis obovatis v. oblongis obtusissimis v. breviter et obtuse acuminatis, pedicellis apice* 3 (*rarius* 1 ?) *floris.*

26. *S. Fendleriana*, Benth. Sepalis canescentibus, antheris filamento subbrevioribus breviter apiculatis.

27. *S. quadrivalvis*, Seem. Sepalis glabris, antheris filamento longioribus longius apiculatis.

††† *Foliis acuminatis plerisque oppositis, pedunculis paucifloris.*

28. *S. laurifolia*, Benth. Antheris glabriusculis tenuiter apiculatis filamento hirsuto multo brevioribus.

29. *S. oppositifolia*, Spruce. Antheris puberulis breviter apiculatis filamento subæquilongis.

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30. *S. jamaicensis*, Hook. Pedunculis 1-floris, sepalis semipollicaribus, petalis brevioribus subtrifidis.

I. Paniculatæ.

1. **S. corymbiflora, *DC.*, *Prod.* i. p. 516. Folia ovata, acuminata, 3–4 poll. longa, vix coriacea, reticulato-venosa, integerrima; petiolo pollicari. Panicula terminalis, corymbosa, floribunda. Alabastra oblonga. Sepala submembranacea, canescentia, 5–6 lin. longa. Antheræ lineares, 3–3½-lin. longæ, filamento brevi, apicula brevi. Stylus elongatus, subacutus, integer.**

Hab. Cayenne, *Martin*.

2. **S. durissima, *Spruce*, sp. n. Arbor recta, 40-pedalis, trunco tenui, diametro 3-unciali, ligno ferreo. Folia breviter petiolata, ovata v. obovata, brevissime acuminata, 3–4-pollicaria, integerrima, coriacea, nitida, rete venularum inconspicuo, basi cuneata v. rotundata, petiolo 2–3-lineari. Stipulæ inconspicuæ. Panicula corymbosa, terminalis, laxiflora. Pedicelli incrassati, canescentes, nunc semipollicares et ebracteati, nunc paulo longiores et bracteolis 1–2 parvis subulatis infra medium onusti. Sepala 4–5-lin. longa, albida, crassa, extus minute canescenti-tomentella. Stamina numerosissima, filamento brevissimo complanato; anthera lineari, 4-lin. longa, minute puberula, apice vix brevissime apiculata. Ovarium sessile, tomentosum, complete 4-loculare; ovulis plurimis biseriatis. Stylus pubescens, rigidus, integer, apice truncatus.**

Hab. In woods about Panurè, on the Rio Uaupès in North Brazil, *R. Spruce*, n. 2788.

3. S. laxiflora, *Spruce*, sp. n. Arbor 60-pedalis, corona ramosissima. Folia sparsa, in speciminibus floridis Spruceanis ovata, acuminata, 2–4-pollicaria, integerrima, basi rotundata, tenuiter coriacea, nitidula, reticulato-venosa; in fructifero Fendleriano paulo majora, rigidius coriacea et nitidiora. Panicula terminalis, foliata, laxa. Pedicelli semipollicares, tomentelli, vix incrassati. Alabastra ovoidea, 5-lin. longa, siccitate canescenti-tomentella. Sepala eburnea, decidua. Antheræ (*S. durissimæ*) puberulæ. Stylus puberulus, apice attenuatus. Ovarium complete 4-loculare, ovulis paucis. Capsula (in specimine

Fendleriano) 1½–2-pollicaris, aculeis pollicaribus rectis echinata, pericarpio crasso, intus monosperma.

Hab. In woods near the village of St. Isabel, on the Pacimone, an affluent of the Casiquiare in Venezuela, *R. Spruce*, n. 3376; near the colony of Tovar, Venezuela, *Fendler*, n. 1746.

4. S. PANICULATA, *Spruce*, sp. n. Folia oblonga, obtusa, 4–5-pollicaria, integerrima, basi anguste cordata, auriculis brevibus rotundatis, rigide coriacea, nitida, venulis inconspicuis. Panicula terminalis, foliata, subcorymbosa, laxe multiflora. Pedicelli semipollicares. Alabastra subglobosa, circa 2-lin. diametro. Antheræ quam in *S. durissima*, paulo minores, cæterum similes. Ovarium 4-loculare. Stylus apice attenuatus.

Hab. On the banks of the Rio Uaupès in North Brazil, *R. Spruce*, n. 2714.

II. Corymbulosæ.

5. S. SYNANDRA, *Spruce*, sp. n. Arbor nobilissima, 100-pedalis, radicibus emersis compressis suffulta. Folia late ovata, obtusissima, 8-pollicaria, basi late rotundata v. subcordata, coriacea, elevato-penninervia et reticulato-venulosa; petiolo 1–2-pollicari, canescente. Pedunculi axillares, 3-pollicares, paniculam brevem dichotomam ferentes. Flores albidi. Sepala lato-lanceolata, crassa, canescentia, 9–10-lin. longa. Filamenta brevissima. Antheræ puberulæ, lineares, interiores 6-lin. longæ, vix apiculatæ, exteriores breviores, evidentius apiculatæ, omnes in massam densam leviter cohærentes et simul deciduæ, nec vere monadelphæ. Ovarium 4-gonum, 4-loculare; ovulis paucis, pendulis. Stylus elongatus, integer. Capsula junior oblongo-4-gona, tomentella, haud setosa, sed verisimiliter tardius setis armata.

Hab. In woods near the banks of the Rio Uaupès in North Brazil, *R. Spruce*, n. 2807.

6. S. SCHOMBURGKII, sp. n. Tota glabra. Rami crassi. Folia ovata v. elliptica, 8-pollicaria et majora, pleraque obtusa, basi cuneata; petiolo 1–2-pollicari, coriacea, nitidula, prominenter penninervia, reteque venularum sæpe conspicua. Pedunculi 1–1½-pollicares, axillares, crassi, subcompressi, cymam 1½-pollicarem 2–3-chotomam ferentes. Sepala semipollicaria, crassa, canescenti-tomentella. Antheræ lineares, 4–5 lin. longæ, vix apiculatæ, fere glabræ, filamentis brevissimis. Ovarium vix complete 4-loculare, placentis medio conniventibus nec coadunatis. Stylus elongatus, integer.

Hab. British Guiana, *Rob. Schomburgk*, 2nd coll. n. 773; *Rich. Schomburgk*, n. 1440.

7. S. FLORIBUNDA, *Spruce*, sp. n. Arbor 20–30-pedalis. Folia elliptico-oblonga, acuminata, 8-pollicaria et longiora, crasso-coriacea, nitida, venis primariis prominentibus et rete venularum conspicua,

basi rotundata; petiolo 1–2-pollicari. Pedunculi axillares, 3–4-pollicares, paniculam corymbosam demum bis terve 3-chotomam seu umbellatam circa 4 poll. latam ferentes. Pedicelli 8–9 lin. longi. Flores nutantes, in vivo eburnei. Sepala 4-lin. longa, acuminata. Filamenta brevia, pubescentia. Antheræ glabriusculæ vix duplo longiores, acumine tenui anthera ipsa vix dimidio breviore. Ovarium (superne vix complete) 4-loculare. Stylus integer, acutiusculus.

Hab. In damp woods near San Carlos on the Rio Negro, in North Brazil, *R. Spruce*, n. 3680.

III. Axilliflorǽ stipulatǽ.

8. S. dentata, *Linn. Spec. Pl.* p. 730. Folia 8–13-pollicaria, sinuato-dentata, obtusa v. acuminata; petiolo 1–4-pollicari. Calyx cyathiformis, truncatus, 6–10-dentatus. Antheræ lineares, pubescentes, apice connectivo glabro breviter apiculatæ. Ovarium 4-loculare (ex Aubletio interdum 5–6-loculare). Stylus integer v. apice brevissime lobatus. Fructus setis longis subulatis flexuosis densissime echinatus.

Hab. Cayenne, *Martin*; British Guiana, *Rob. Schomburgk*, 2nd coll. n. 768, *Rich. Schomburgk*, n. 1388. Also probably Surinam, *Hostmann*, n. 1025; but the calyx is wanting in my specimens of the latter.

9. S. macrophylla, *Spruce*, sp. n. Arbor gracilis, 18-pedalis, ramis paucis elongatis supra medium foliiferis floridisque. Folia ampla, fere *S. dentatæ*, majora sesquipedalia, petiolo 3–7-pollicari, late oblonga v. ovata, obtusa v. acuminata, late sinuato-subdentata. Stipulæ lanceolatæ, crassiusculæ, persistentes. Racemi petiolo breviores, canescenti-tomentelli. Pedicelli fere pollicares, bracteis subtendentibus brevibus, ovatis, persistentibus. Calyx hemisphæricus, ruber. Sepala 5–8, ovata, utrinque tomentosa, demum recurva, uniseriatim valvata v. 1–2 interiora. Stamina *S. dentatæ*, in vivo flava, pubescentia, linearia, apicula brevi glabra. Stylus subinteger. Ovarium 5 (4–6?) -loculare. Capsula setis pollicaribus rectis rigidis subspinescentibus densissime echinata.

Hab. In the gapo on the Rio Uaupès in North Brazil, *R. Spruce*, n. 2478.

10. S. pubiflora, *Planch. et Lind. in Herb. Hook. MS.* Arbor. Folia ovata v. oblonga, 6–8-pollicaria, obtusa, vix sinuata, coriacea, glabra; venis primariis venulisque transverse reticulatis, subtus prominentibus; petiolo ½–1-pollicari. Racemi axillares, floribundi, 2–3-pollicares, molliter pubescentes. Stipulæ et bracteæ lineari-lanceolatæ, persistentes. Flores nutantes. Sepala 6–10, 1–2-seriata, 3-lin. longa, pubescentia. Antheræ oblongæ, filamento v. apicula tenui hispidula vix longiores. Ovarium 5 (4–6?) -loculare. Stylus apice breviter divisus.

Hab. In the Sierra Nevada, in the province of Rio Hacha, in New Grenada, at an altitude of 5000 feet, *Schlim*, n. 839.

11. S. RUFA, *Planch. in Herb. Hook. MS.* Folia ovata, obtusa, basi cordata, ¾–1-pedalia, coriacea, supra glabra et nitida, subtus rufo-pubescentia v. villosa; venis primariis, venulis transversis, et rete minore prominentibus; petiolo 1–3-pollicari. Stipulæ ovatæ, fimbriatæ, persistentes. Racemi breves, villosi. Pedicelli 2–3-lin. longi. Sepala 4–6, intus glabriuscula, 2-lin. longa. Staminum nonnisi fragmenta adsunt, iis *S. pubifloræ* similia videntur. Ovarium 4 (5–6?) -loculare, apice incomplete divisum. Stylus apice divisus.

Hab. Cayenne, *Martin.*

12. S. MASSONI, *Sw.*; *Griseb. Fl. Brit. W. Ind.* p. 99.

Hab. Guiana and the West Indies.

The diagnosis given above is taken from Grisebach's description, as the specimens are not yet returned to the Kew Herbaria.

IV. AXILLIFLORÆ BRACHYSTACHYÆ.

13. S. OBTUSA, *Planch. in Herb. Hook.* (Adenobasium obtusifolium, *Moric. Pl. Nouv. Amer.* p. 83, t. 55.)

Hab. Province of Bahia, Brazil, *Blanchet*, n. 1659.

14. S. PARVIFLORA, *Planch. in Herb. Hook.* (Dasynema obtusum, *Splitg. Pl. Nov. Surim.* p. 4; *Van Hoev. et De Vriese Tijdschr.* ix. p. 98; *Schlecht. et Mohl, Bot. Zeit.* i. p. 95).

Hab. In woods near Port Belair, Surinam, *Splitgerber*; also *Hostmann*, n. 412.

15. S. SINEMARIENSIS, *Aubl. Pl. Gui.* p. 535, t. 212; *Griseb. Fl. Brit. W. Ind.* p. 99.

Hab. British Guiana, *Parker*; *Rob. Schomburgk*, 1st coll. n. 1021 (in part) and 1044; St. Ann's Mountain, Trinidad, *Purdie*; St. Vincent's, *Anderson.*

Some, however, of Schomburgk's and other flowering specimens are rather doubtfully referred to this species.

16? S. BREVIPES, sp. n. Folia obovata v. obovali-oblonga, 3–8 poll. longa, obtusissima, coriacea, supra glabra, subtus rufo-puberula; venis primariis transversis reteque venularum elevatis. Petioli 1–4-lin. longi, uti ramuli molliter rufo-pubescentes. Racemi breves, floribundi. Bracteæ parvæ. Pedicelli circa 2-lin. Calyx pubescens; sepalis 4–6, vix 1½-lin. longis. Stamina exserta; filamenta villosa; antheræ oblongæ, iis breviores, puberulæ, apicula brevi obtusa. Stylus apice breviter divisus.

Hab. British Guiana, *Rob. Schomburgk*, 1st coll. n. 1021.

Mixed with the last, of which it may possibly prove to be a variety, notwithstanding the form and the pubescence of the leaves.

17. S. STIPITATA, *Spruce*, sp. n. Arbor dense ramosa, 30-pedalis. Folia late ovata, 5–6-pollicaria, grosse dentata, glabra; venis primariis

subtus valde elevatis; venulis transversis, conspicuis; petiolo 1–1½-pollicari. Racemi laxi, fructiferi, 2–3-poll. longi, subcompositi. Calyx 4–5-fidus, sepalis circa 2 lin. longis. Staminum nonnisi fragmenta adsunt, hirta videntur; antheris apiculatis. Capsula fere *S. sinemariensis* nisi stipite lineam longo fulta.

Hab. On the Casiquiare above the mouth of the Pacimone, and very common in Cunucunuma, *R. Spruce*, n. 3197.

18. S. PUBESCENS, *Benth.* (Dasynema pubescens, *Poepp. et Endl. Nov. Gen. et Sp.* iii. p. 74, t. 284.)

Hab. In woods near Ega, on the Amazon, in North Brazil, *Poeppig*.

I have not seen his specimens, but others from Cayenne, *Martin*, answer perfectly to his figure and description, except that the pedicels are rather shorter.

19. S. CUNEIFOLIA, *Mart. Herb. Fl. Bras.* p. 94.

Hab. In woods on the Amazon, in North Brazil, *Martius*.

I have not seen authentic specimens of this species, but one of *Blanchet's* from tropical Brazil, n. 2356, agrees with Martin's character. The flowers and stamens are those of *S. guianensis*, of which it may prove to be a variety. The leaves are larger, with petioles an inch long.

20. S. MICROCARPA, *Planch. in Herb. Hook.* sp. n.? Glabra. Folia obovato-oblonga, acuminata, 4–6-pollicaria, basi angustata; petiolo 1–3-lin. longo; venis primariis subtus elevatis. Pedunculi breves, pauciflori. Capsula sessilis, parva, setis rigidis echinata, fere *S. guianensis*.

Hab. Cayenne, *Martin*.

21. S. GUIANENSIS, *Benth.* (Ablania guianensis, *Aubl. Pl. Gui.* p. 585, t. 234). Folia 3–4-poll. longa, petiolo 6–9-lin. longo. Antheræ exsertæ, hirtellæ, filamento breviores, apicula quam anthera ipsa dimidio fere breviore.

Hab. Cayenne. I have a specimen derived from the Lambertian Herbarium, but without the collector's name.

22. S. ALNIFOLIA, *Mart. Herb. Fl. Bras.* p. 94, n. 87. Folia 3–4 poll. longa, obtusa v. brevissime acuminata, apicem versus subrepanda, basi rotundata; petiolo semipollicari. Racemi petiolo breviores.

Hab. In woods near Rio Janeiro, *Martius, Pohl, Mrs. Graham*.

23. S. RIPARIA, *Planch. in Herb. Hook.* (Dasynema riparium, *Gardn. in Hook. Lond. Journ. Bot.* ii. p. 324). Glabra. Folia ovali-elliptica v. oblonga, acuminata, 3–4-pollicaria; petiolo 3–6-lineari. Racemi laxi, petiolo longiores; pedicellis subsemipollicaribus. Sepala 4, 2 lin. longa. Antheræ puberulæ, filamento sublongiores, apiculatæ. Ovarium defloratum obovoideo-subglobosum, haud angulatum. Capsula monosperma, valvulis crassis, vix pollicaribus. Setæ demissæ, mol-

lissimæ, hirtellæ, in capsula juniore tomentum breve velutinum formantes, in matura 2 lin. longæ.

Hab. In the Organ Mountains near Rio Janeiro, *Gardner*, n. 327.

24. S. MONOSPERMA, *Vell. Fl. Flum.* v. t. 100 (Adenobasium salicifolium, *Presl, Symb. Bot.* p. 40, t. 27.—Dasynema ochrocarpa, *Mart. Herb. Fl. Bras.* n. 831). Similis *S. ripariæ.* Folia angustiora, paulo minora; petiolo nunc brevissimo, rarius 2–3-lin. longo. Pedunculi breves, pauciflori. Flores minores, evidentius angulati. Ovarium defloratum pyramidato-tetragonum, tomentellum. Capsula fere *S. ripariæ.*

Hab. In the province of Minas Geraes, Brazil, *Claussen*; on the Corcovado Mountain near Rio Janeiro, *Gardner*, n. 826.

25. S. HIRSUTA, *Planch. in Herb. Hook.* (Dasynema hirsutum, *Schott in Spreng. Syst. Cur. Post.* 408). Folia *S. monospermæ* v. angustiora, subtus pubescentia. Ramuli et petioli molliter villoso-pubescentes. Flores in speciminibus desunt. Capsula *S. ripariæ*, setis tamen paulo longioribus rigidioribusque.

Hab. In woods at Tijuca near Rio Janeiro, *Gardner*, n. 5374.

26. S. FENDLERIANA, sp. n. Ramuli et inflorescentia cano-puberuli. Folia obovata v. obovali-oblonga, obtusissima, 1½–2 poll. longa, supra glabra et nitidula, subtus juniora canescentia, adulta fere glabra; venis primariis elevatis; petiolo 3–4-lin. longo. Pedunculi subsemipollicares, 1–3-flori. Flores nutantes. Sepala 4, subcanescentia, 3 lin. longa. Antheræ hirtellæ, breviter acuminatæ, filamento paulo breviores.

Hab. Near the colony of Tovar, in Venezuela, *Fendler*, n. 2489.

27. S. QUADRIVALVIS, *Seem. Bot. Her.* p. 85, t. 15 (Dasycarpus quadrivalvis, *Oerst. Pl. Nov. Centr. Amer.*). Pedunculi longe 3-flori, uti sepala glabri. Antheræ puberulæ, filamento longiores et longiuscule apiculatæ. Capsula velutina.

Hab. Central America, province of Veraguas, *Seemann*, and of Nicaragua, *Oersted.*

28. S. LAURIFOLIA, *Benth.* (Dasynema laurifolium, *Benth. in Hook. Journ. Bot.* iv. p. 132). Arbor dumosa, 30-pedalis. Flores albidi. Antheræ glabriusculæ, tenuiter apiculatæ, filamento hirsuto multo breviores.

Hab. On the Rio Negro in North Brazil, *Rob. Schomburgk*, 1st coll. n. 936; in the gapo below San Isabel, *R. Spruce*, n. 1961.

29. S. OPPOSITIFOLIA, *Spruce*, sp. n. Affinis *S. laurifoliæ.* Folia (laurina) 4–8-pollicaria, ovato-lanceolata v. oblonga, longiuscule acuminata, basi angustata; petiolo ½–1-pollicari; venis primariis prominentibus, venulis parum conspicuis. Pedunculi quam in *S. laurifolia* longiores, tenuiores, laxe pauciflori, uti sepala glabri. Flores minores.

Sepala 2 lin. longa. Antheræ puberulæ, filamento subæquilongæ, apiculo brevi.

Hab. Near San Carlos on the Upper Rio Negro, *R. Spruce*, n. 3689.

30. S. JAMAICENSIS, *Hook. Ic. Pl.* t. 693 to 696; *Griseb. Fl. Brit. W. Ind.* p. 98. Pedunculi 1-flori. Sepala semipollicaria.

Hab. Jamaica, *Purdie.*

This species is remarkable for its large solitary flowers, and for the presence of petals, which are sometimes notched or toothed, showing an approach to *Echinocarpus* and *Elæocarpus.*

ECHINOCARPUS, *Blume.*

This Asiatic genus, very shortly characterized by Blume in his 'Bijdragen,' was placed by him among *Bixaceæ*, probably on account of some external analogy of its fruit with that of *Bixa*, the ovary not having been examined. Clos, describing with rather more detail an incomplete specimen of Zollinger's, was still unable to ascertain the structure of the ovary, and consequently has not removed the plant from *Bixaceæ*. We have now, however, in the collections of Griffith, and of Hooker and Thomson, five Indian species besides an Australian one from other collectors, which enable us fully to complete the character of the genus, and to fix its place in close proximity to the American *Sloanea*, connecting them with the Asiatic *Elæocarpus*. The large convex disk, pitted all over with the scars of the stamens after their fall, the acuminate anthers opening towards the summit, the ovary usually 4- or 5-celled with several ovules in each cell, the simple style, the echinate or densely velvety capsule opening in thick woody valves, and containing one or very few seeds, and, as far as we know, the seeds themselves, are all precisely those of *Sloanea*. The generic distinction lies in the perianth, which is somewhat anomalous in the order; the 4 or 5 sepals are decidedly imbricate in æstivation; and the petals, always present, usually of a greenish calycine aspect, although thinner than the sepals, are as long as them or longer, usually very broad and more or less lobed. The latter character connects the genus with *Elæocarpus*, from which it abundantly differs in the sepals, in the disk, and in the fruit.

The following are the species now known:—

§ 1. *Capsula aculeis longis, rigidis echinata.*

1. *E. murex.* Foliis oblongis sublanceolatisve acuminatis (2–4-poll.) glabris, fructus aculeis basi incrassatis.

2. *E. Sigun.* Foliis ovatis acutis acuminatisve (4–6-poll.) glabris, fructus aculeis subfoliatis.

3. *E. assamicus.* Foliis ovalibus obovalibusve brevissime cuspidatis (6–8-poll.) glabris, fructus aculeis subulatis.

4. *E. sterculiaceus.* Foliis ovalibus obovalibusve brevissime cuspidatis (5–10-poll.) subtus pubescentibus, fructus aculeis subulatis.

§ 2. *Capsula setis brevibus, densissimis, mollibus quasi velutina.*

5. *E. tomentosus.* Foliis ovalibus subtus tomentosis subrufis, petalis brevibus.

6. *E. australis.* Foliis obovali-oblongis sinuato-dentatis glabris (petalis angustis ?).

7. *E. dasycarpus.* Foliis oblongis obovalibusve integerrimis serrulatisque glabris, petalis latis calyce longioribus.

1. E. MUREX, sp. n. Tota glabra excepto tomento tenuissimo pedunculorum. Folia quam in cæteris speciebus minora et angustiora, supra medium longiuscule acuminata, integerrima, basi rotundata, rigidule membranacea, penninervia et reticulato-venulosa; petiolo subsemipollicari. Flores non vidi. Pedunculus fructifer pollicaris. Capsula ovoideo-globosa, sesquipollicaris, in valvulas 4–5 crassissime lignosas dehiscens; aculei semipollicares, minus conferti quam in *E. assamico* et *E. sterculiaceo*, basi in tuberculum incrassati.

Hab. Khasia, at an elevation of 3000–5000 feet, *Hooker and Thomson*, distributed as *Echinocarpus* n. 5.

2. E. SIGUN, *Blume*; *Clos. in Ann. Sc. Nat. Par.* ser. 4, viii. p. 266.

Hab. Java, *Blume*; *Zollinger*, n. 3169.

I have seen no specimen, but from Clos's description it differs from *E. murex* and *E. assamicus* both in the form of the leaves and the prickles of the capsule.

3. E. ASSAMICUS, sp. n.

Hab. Upper Assam, *Griffith.*

This is no doubt the "altera species" alluded to by Griffith in his 'Itinerary Notes,' Posthumous Papers, ii. p. 169. It is closely allied to the *E. sterculiaceus* in the form, size, and texture of the leaves, in the young ovary, stamens and fruit, and may possibly prove to be a variety only of that species; but the leaves are perfectly glabrous, except small tufts in the axils of the veins, and are perhaps more narrowed below the middle. The sepals and petals have all fallen off from our specimens.

4. E. STERCULIACEUS, sp. n. (Elæocarpea, *Griff. Itin. Not.* n. 866 in Posth. Pap. ii. p. 168). Folia latiuscula, ovalia v. obovalia, versus

apicem rotundata, acumine brevi obtuso, margine leviter et remotiuscule serrata, ima basi obtusa et sæpius leviter cordata, subtus pube laxa copiosa vestita. Petioli ½–1-pollicares. Pedicelli tomentosi, 1–1½-pollicares. Perianthii nonnisi reliqua pauca vidi. Sepala, teste Griffithio, oblonga sunt, numero 4 v. 5, et petala numero varia, sæpius biseriata, 4 exteriora sepalorum longitudine, interiora 4 minora. Stamina in speciminibus supersunt pauca. Antheræ lineari-oblongæ, filamento hirtello paulo breviores. Ovarium defloratum, 4–5-costatum, tomentosum, cito aculeis obtegitur. Capsula ultrapollicaris, aculeis subulatis rectis 8–9 lin. longis densissime armata.

Hab. Bootan, *Griffith*; Sikkim, *J. D. Hooker*, distributed as *Echinocarpus* n. 2.

I have adopted the specific name proposed by Griffith on account of the general resemblance of the tree to a *Sterculia*.

5. E. TOMENTOSUS, sp. n. Arbor altissima. Folia pleraque 6–8 poll. longa, 3–4 poll. lata, breviter acuminata, margine serrato-crenata, basi rotundata, rarissime ad petiolum subcordata, crassiora quam in *A. sterculiacea*, supra glabra sed opaca, subtus pube brevi subferrugineo molliter tomentosa; petiolo 1–2-pollicari. Pedicelli semipollicares v. paulo longiores, recurvi, tomentosi, apice incrassati. Flores fere ½ poll. diametro. Sepala 4–5, ovata, obtusa, tomentosa. Petala subbreviora, latissima, lobata. Antheræ filamento subæquilongæ. Capsula ovoidea, sesquipollicaris, lignosa, 4–5-valvis, setis confertissimis 1-lin. longis quasi velutina.

Hab. Bootan, *Griffith*; Sikkim, *J. D. Hooker*, distributed as *Echinocarpus* n. 1.

6. E. AUSTRALIS, sp. n. Arbor 80-pedalis. Folia nunc fere pedalia, obovali-oblonga, supra medium longe angustata, nunc breviora, obovata v. ovalia, omnia irregulariter sinuato-dentata, prope basin plus minus angustata, ima basi obtusa v. subcordata, rigide membranacea et utrinque glaberrima; petiolo ½-poll. v. rarius 1 poll. longo. Pedunculi ad apices ramorum crebri, pollicares, vix tomentelli. Sepala in speciminibus pauca supersunt, anguste ovata v. oblonga, obtusa. Petala vix latiora videntur, sed in speciminibus nostris imperfecta. Capsulæ juniores setis brevibus confertissimis velutinæ.

Hab. Eastern Australia; in the scrub near Dunuduni, Moreton Bay district, *Macleay*; at Kiama, in New South Wales, *Harvey*.

7. E. DASYCARPA, sp. n. Arbor procera. Folia variabilia, pleraque anguste ovalia v. late oblonga, acuminata, 4–5-pollicaria, nunc obovali-oblonga v. angustiora, 6–9-poll. longa, rarius iis *E. muricis* subsimilia, omnia glabra, membranacea et basi sæpius acutata v. angustata; petiolo subsemipollicari. Pedunculi ad apices ramorum crebri, 1½-pollicares. Sepala 4 v. rarius 5, late ovalia v. orbiculata. Petala sepalis dimidio ad duplo longiora, latissima, lobata, pallide flavovirentia. Antheræ oblongæ, filamento breviores. Capsula pollicaris,

subglobosa, in valvulas 4–5 crassas, lignosas dehiscens, extus setis brevibus confertissimis velutina.

Hab. Bootan and Darjeeling, *Griffith*; Sikkim, *J. D. Hooker*, distributed as *Echinocarpus* n. 3 and 4.

It varies much in the shape and size of the leaf, as well as in the breadth of the sepals; but I believe that the specimens I have brought together all belong to one species.

TRICUSPIDARIA, *Ruiz et Pav.*

The *Crinodendron Patagua* of Molin should be united with *Tricuspidaria* as a second species. The discrepancy in the character attributed has arisen from the deciduous sepals having been overlooked, and the petals described as a calyx. These petals are in both species, as in *Plagiopteron*, valvate in æstivation, which is exceptional in the order.

ELÆOCARPUS, *Linn.*

A. Gray has shown that *Beuthia*, Endl., and *Acronodia*, Blume, do not differ generically from the true *Elæocarpi*, with which *Ganitrus*, Gærtn., and *Aceratium*, DC., had already been united. *Monocera*, Jack, including *Dicera*, Forsk., is often admitted by modern botanists as a good genus, distinguished by the aristate or cuspidate anthers, accompanied usually by larger flowers and more silky-hairy petals; but the latter characters are not constant, and the points to the anthers, very variable in length, can scarcely be considered of more value here than in the allied genus *Sloanea*. But if *Monocera* be taken as a section only of *Elæocarpus*, the whole forms a natural, well-defined genus, distinguished from *Sloanea* and *Echinocarpus* by the form of the disk or torus, and by the drupaceous fruit; and likewise from the latter by the valvate sepals, and from the former by the petals. *Aristotelia*, Lher. (including *Friesia*, DC.), still nearer allied to *Elæocarpus*, has the fruit baccate and small, not drupaceous; and *Vallea* and *Tricuspidaria* are capsular. The species of *Elæocarpus* are all Asiatic or Australian (including the Pacific Islands); above 60 are described or represented in our herbaria, but it is probable that a careful monographist would reduce them to about 45.

Among the genera enumerated as Tiliaceous in Lindley's 'Vegetable Kingdom' or other recent works, *Vantanea*, Aubl., belongs to *Humiriaceæ*; *Bancroftia*, Macf., is *Tovaria*, Ruiz et Pav., in *Capparideæ*; *Anstrutheria*, Gardn., belongs to *Rhizophoraceæ* (*Legnotideæ*); *Antholoma*, Labill., which Planchon thinks to be allied to *Tiliaceæ*, is probably much nearer *Sapotaceæ*.

Notes on *Bixaceæ* and *Samydaceæ*. By George Bentham, Esq., V.P.L.S.

[Read March 7, 1861.]

There is a long series of polypetalous Orders with parietal placentation, so closely connected with each other, that systematists have in general endeavoured to keep them together in the linear series, although the doing so interferes much with any definite subdivision of the Class. There is no doubt that the hypogynous Capparideæ, Cistaceæ, Violaceæ, and Bixaceæ can only be separated from the perigynous Samydeæ, Homalineæ and Passifloreæ by an arbitrary line; and that this series and that of the curvembryonous Orders (Caryophylleæ and its allies) furnish the strongest arguments against the Candollian arrangement. Yet even in these Orders, the chain which connects them is nearly as closely linked on to others which, under any arrangement, are kept wide apart. Thus Capparideæ are almost blended with Cruciferæ, Bixaceæ and Samydaceæ with Tiliaceæ, Violaceæ through Sauvagesieæ with Frankeniaceæ and Hypericineæ, Passifloreæ with Cucurbitaceæ, Loasaceæ, Turneraceæ, &c. Parietal placentation, moreover, cannot be taken as a character of so high an order as it might appear at first sight; for it occurs exceptionally in almost every large calycifiorous Order, as well as in a few Thalamifloræ, which have normally axile placentas; and it is not constant in several of the above-mentioned Orders where it prevails.

In our 'Genera Plantarum,' Dr. Hooker and myself have determined, for reasons which we hope to give in detail, to maintain the Candollian series in its general features; and therefore, in limiting the Orders now under consideration, we have to rely, in the first instance, on staminal insertion. Among those botanists who generally follow these views, Capparideæ, Cistineæ and Violaceæ are universally retained under Thalamifloræ, and Passifloreæ under Calycifloræ; the intermediate genera have been very variously grouped. DeCandolle distributed them into four Orders,—Bixaceæ and Flacourtiaceæ placed next to each other, in Thalamifloræ; Samydeæ and Homalineæ, rather widely separated, under Calycifloræ—but at that time he had had opportunity of examining only a very small number of genera. Endlicher, in his 'Genera Plantarum,' and Bennett, in the 'Plantæ Javanicæ Rariores,' proposed the union of the two first Orders. Clós, in the 'Annales des Sciences Naturelles,' ser. 4. vol. viii., in revising the Order thus combined, unites with it a small group proposed by

Blume under the name of Pangiaceæ, without otherwise modifying its general limits, retaining in it *Banara* and its allies, which have decidedly perigynous stamens. It is, probably, this perigynous character of the latter genus which has induced Grisebach, in his 'Flora of the British West Indies' and 'Erläuterungen ausgewählter Pflanzen des tropischen Amerikas,' and Harvey, in his 'Flora Capensis,' to bring Samydeæ into the same group. Harvey, moreover, connecting these with such Homalineæ as have an entirely free ovary, includes also the whole of the latter group under one Order of Bixaceæ. The course we propose to adopt is so far to follow these authors as to unite DeCandolle's four Orders into two; Bixaceæ with hypogynous, and Samydaceæ with perigynous stamens; transposing from the former to the latter the genus *Banara*, in which the perigynous character is very decided, and accompanied by others derived from the floral envelopes. These accessory characters will also assist us in classing some other genera whose staminal insertion is somewhat ambiguous.

The Order Bixaceæ, thus constituted, has for its chief prevailing characters indefinite hypogynous stamens, a compound unilocular ovary with parietal placentas, anatropous ovules, and a straight embryo immersed in a fleshy albumen. The sepals are imbricate or open in the bud; the petals, when present, much imbricate, and larger, more petaloid and more deciduous than the sepals, or passing gradually into them. The stem is woody, the leaves alternate, the stipules small and usually deciduous. Three small exceptional genera have definite or subdefinite stamens, two have a curved embryo, two have the placentas united in the axis; all, however, are here admitted on account of a combination of other characters which render them inseparable from undoubted Bixaceous genera.

The Samydaceæ, extended as we propose so as to include Homalineæ, have indefinite or more or less definite perigynous stamens, with the ovary and embryo of Bixaceæ. The sepals are valvate or slightly imbricate; the petals, when present, regularly alternate with the sepals, are of a nearly similar consistence, and persist with them so as to have been usually described as an inner series of sepals. The stem is woody, with alternate leaves, and small, usually deciduous stipules, as in Bixaceæ.

The most important characters distinguishing the Orders nearest allied to Bixaceæ or Samydaceæ are the exalbuminous curved embryo and usually dimerous flowers of Capparideæ, the orthotropous

ovules of Cistineæ, the five erect introrse anthers, connivent or connate in a ring round the ovary of Violaceæ, the axile placentation and valvate sepals of Tiliaceæ, and among Calyciforæ the corona of Passifloraceæ (which include *Malesherbia*).

With regard to the distribution of the genera of Bixaceæ into tribes, the most recent, founded on a general survey of the Order, is that proposed by Clos in the above-mentioned memoir in the 'Annales des Sciences Naturelles;' for Harvey's and Grisebach's are partial only, based the one upon the Cape genera, the other on the West Indian ones. Clos proposes five tribes—Flacourtieæ, Azareæ, Lætieæ, Bixeæ, and Pangieæ. The last of these, Pangieæ, is well marked by the scales at the base of the petals, and is by some considered as constituting a distinct Order. The Azareæ consist chiefly of *Banara*, *Kuhlia*, and *Pineda*—all decidedly perigynous, and which we propose, as above mentioned, to remove, as one genus, to Samydaceæ. *Azara* itself is, however, hypogynous or nearly so, and appears to us to be much nearer allied to *Scolopia*, and to belong to the tribe of Flacourtieæ, in which we would include Lætieæ rather as a subtribe than as a distinct tribe. On the other hand, as we propose bringing *Cochlospermum* and *Amoreuxia* next to *Bixa*, we would distinguish the Bixeæ by the peculiar anthers and some other characters common to these genera only, and separate from them *Oncoba*, *Mayna* and their allies into a distinct tribe, which we would name *Oncobeæ*.

The following would then be our arrangement of the Order:—

Tribus I. Bixeæ. Flores hermaphroditi v. rarius polygami. Petala ampla, esquamata, contorta. Antheræ apice biporosæ v. breviter bivalves. Endocarpium membranaceum, solubile.

Genera:—1. Cochlospermum, *Kunth*. 2. Amoreuxia, *Moç. et Sess.* 3. Bixa, *Linn.*

Tribus II. Oncobeæ. Flores dioici v. polygami. Sepala et petala valde imbricata, hæc majora esquamata. Antheræ lineares, birimosæ.

Genera:—4. Oncoba, *Forsk.* 5. Mayna, *Aubl.* (Lindackeria, *Presl.*) 6. Carpotroche, *Endl.* 7. Dendrostylis, *Karst. et Triana.*

Tribus III. Flacourtieæ. Flores hermaphroditi v. dioici. Petala 0 v. sepalis parum majora, imbricata, esquamata. Antheræ birimosæ, breves v. rarius (in flore apetalo) lineares.

Subtribus 1. Lætieæ. Flores hermaphroditi v. rarius polygami.

* *Stamina ∞. Antheræ lineares. Petala* 0.

Genus :—8. Ryania, *Vahl.*

** *Stamina ∞. Antheræ breves.*

a. Sepala valde imbricata.

Genera :—9. Lætia, *Linn.* 10. Ludia, *Lam.* 11. Aphloia, *Benn.* (Neumannia, *A. Rich.*) 12. Rawsonia, *Harv.*

b. Sepala parum imbricata v. aperta.

Genera :—13. Azara, *Ruiz et Pav.* 14. Scolopia, *Schreb.* (Phoberos, *Lour.*).

*** *Stamina* 5–10.

Genus :—15. Erythrospermum, *Lam.*

Subtribus 2. Euflacourtieæ. Flores dioici v. rarius polygami. Antheræ breves.

* *Bacca.*

Genera :—14. Flacourtia, *Lhér.* 15. Bennettia, *Miq.* 16. Xylosma, *Forsk.* (Hisingera, *Hellen.*) 17. Dovyalis, *E. Mey.* 18. Aberia, *Hochst.*

** *Capsula.*

Genus :—19. Trimeria, *Harv.* (Monospora, *Hochst.*).

Tribus IV. Pangieæ. Flores dioici. Petala basi squama epipetala v. sublibera aucta.

* *Calyx primum integer, per anthesin varie rumpens.*

Genera :—20. Pangium, *Reinw.* 21. Gynocardia, *R. Br.* 22. Bergsmia, *Blume.* 23. Trichadenia, *Thw.*

** *Sepala distincta.*

Genera :—24. Taraktogenos, *Hassk.* 25. Hydnocarpus, *Gærtn.* 26. Kiggelaria, *Linn.*

Cochlospermum, *H.B. et K.*

Planchon, in his valuable memoir on this beautiful and interesting genus (Lond. Journ. Bot. vi. p. 294), has well pointed out its discrepancies from Ternstrœmiaceæ and Cistaceæ, to both of which it had been referred; but he proposes to consider it as the type of

a distinct family, most nearly allied in his opinion to Geraniaceæ and to Bombaceæ, from both of which it appears to us to be far removed in its calyx, stamens, gynæcium, fruit and seeds, although the wool of the latter as well as the foliage may remind us of Bombaceæ. He hints, however, at a connexion with *Bixa* as requiring further investigation; and this has proved to be so close, notwithstanding the exceptional character of the seeds, that we have no hesitation in bringing it into the same tribe. It agrees with *Bixa* in habit, in the yellow juice, palmately veined leaves and large flowers, in the insertion and arrangement of the deciduous sepals and petals, in the large number of hypogynous stamens with peculiar anthers, in the style, and in the valvular rather large capsules, with a membranous more or less separable endocarp. It has three instead of two placentas, which, although in some species they are scarcely more prominent than in *Bixa*, yet in other species form semisepta, especially near the base, dividing the capsule into three more or less complete cells; but the most striking difference is in the cochleate more or less woolly or hairy seeds, with a very much curved embryo. This character, however, will not alone suffice for the establishment of a distinct natural order, especially as it does not exist in *Amoreuxia*. To the species of *Cochlospermum* enumerated by Planchon, we have, as yet, no additions to make.

Amoreuxia, *Moç. et Sess.*

Planchon, in the above-mentioned memoir, has well shown that this genus, identical with *Euryanthe*, Schlecht., must, in the series of families, follow the fate of *Cochlospermum*. Like the latter genus, it has the flowers, valvular capsule, and soluble endocarp of *Bixa*. The seeds, unknown to Planchon, but since received amongst the rich collections of Mr. Charles Wright, and accurately described and figured by A. Gray, are much nearer to those of *Bixa* than of *Cochlospermum*, only differing from the former by the cotyledons more or less bent or folded. The placentæ, however, are completely united in the axis of the ovary and capsule, dividing them into three perfect cells. But here again is a solitary character, no more available for the establishment of a distinct Order in this case than in that of *Flacourtia*.

Bixa, *Linn.*

Of this genus there is one species, furnishing the arnotto of commerce, which, by long cultivation within the tropics, in Africa

and Asia as well as in its native American continent, appears to have established several more or less permanent varieties, differing in the form of the leaves, the size and colour of the flowers, the naked or muricate capsules, &c.; several of which varieties have been proposed as distinct species, which we would agree with Clos in rejecting. There may be more doubt respecting the second and more rare species adopted by Clos, *B. platycarpa*, Ruiz and Pav., from Peru, New Grenada, and Central America, in which the fruit is depressed, globular or reniform, and always very obtuse or flat at the top, not acute as in *B. Orellana*. We have no materials sufficient to judge how far these characters may correspond with any differences in the flowers. See Clos in 'Ann. Sc. Nat. Par.,' ser. 4, viii. p. 260.

Oncoba, *Forsk.*

We have nothing to add to the synonymy and enumeration of species of this genus given by Planchon in a note to the above-mentioned paper. (Hook. 'Lond. Journ. Bot.' vi. p. 295.)

Mayna, *Aubl.*

Considerable confusion as to the circumscription and species of this genus has arisen, partly from the errors which had crept into Aublet's original character and figure, partly from the similarity of the male flowers, by far the most common in our herbaria, in the two genera *Mayna* and *Carpotroche.* The female flowers are readily distinguishable, the placentæ appear never to be more than three in the true *Maynas*, the styles are completely united, and the characteristic tubercles or spines of the fruit may be seen already on the scarcely enlarged ovary. The genus is entirely Tropical-American; it includes *Lindackeria* of Presl, and consists, as far as hitherto known, of the following seven species:—

* *Staminum filamenta basi in columnam conniventia.*

1. M. odorata, *Aubl. Pl. Gui.* p. 921. t. 352.

Hab. Guiana.

Of this I have seen no specimen precisely answering to Aublet's figure as to foliage and inflorescence.

2. M. latifolia (Lindackeria latifolia, *Benth. in Kew. Journ. Bot.* iii. p. 118).

Hab. North Brazil, near Obidos, on the Amazon, *R. Spruce.*

** *Staminum filamenta laxiora.*

3. M. paludosa, *Benth. in Hook. Journ. Bot.* iv. p. 114. Capsula 1 poll.

diametro, tuberculis crassis conicis muricata; valvulis 3, lignosis, per dehiscentiam recurvis.

Hab. Guiana and N. Brazil.

Lindackeria Maynensis, Poepp. et Endl. Nov. Gen. et Sp. iii. p. 63. t. 270, appears to be the same species.

4. M. LAXIFLORA, *Benth. in Hook. Journ. Bot.* iv. p. 114.

Hab. Guiana.

This has the fruit of *M. paludosa*, of which it may prove to be a mere variety.

5. M. LAURINA (Lindackeria laurina, *Presl, Rel. Hænk.* ii. p. 89. t. 65).

Hab. West Mexico, *Hænke.*

I have not seen any specimens.

6. M. PAUCIFLORA (Lindackeria pauciflora, *Benth. in Kew Journ. Bot.* iii. p. 118).

Hab. North Brazil; Tanaii, near Para, *R. Spruce.*

7. M. OVATA, sp. n. Glabra, foliis ovatis acuminatis coriaceis, racemis petiolo vix longioribus paucifloris, filamentis laxis glabris anthera longioribus, capsula echinata.—Ab omnibus differt foliis coriaceis, 3- v. vix 4-pollicaribus, et antheris vix lineam longis. Frutex est orgyalis. Petala circa 4 lin. longa. Capsula aculeis longiusculis echinata.

Hab. Brazil. In the Serra de Araripe, near Brya Grande, in the province of Ceara, *Gardner*, n. 2396.

CARPOTROCHE, *Endl.*

A small genus, well distinguished from *Mayna* by the 6–7-merous gynœcium, with the styles united at the base only, and the globular fruit not muricate, but bearing numerous longitudinal undulating wings or plaits. We have the following three species:—

1. C. BRASILIENSIS, *Endl.* Foliis oblongis obtusis acuminatisve glabris puberulisve, stipulis subulatis, pedicellis florem sericeo-pubescentem subæquantibus v. longioribus.—Folia 4–6-pollicaria. Petala interiora pollicaria.—*Mayna brasiliensis*, Raddi,—Zucc. Pl. Nov. fasc. ii. t. 5.

Hab. Brazil. On hills near Rio Janeiro, *Raddi, Gardner*, n. 247 and 5357; *Mart. Herb. Fl. Bras.* n. 96. In the province of Bahia, *Blanchet.*

2. C. GRANDIFLORA, *Spruce*, sp. n. Foliis amplis obovatis acuminatis molliter pubescentibus, stipulis bracteisque lanceolatis, pedicellis flore amplo dense sericeo brevioribus.—Folia 6–8-pollicaria. Petala obovata, $1\frac{1}{4}$–$1\frac{1}{2}$-poll. longa.

Hab. North Brazil. In the forest below the falls of San Gabriel, on the Rio Negro, *Spruce*, n. 2049, and in Caatingas and rocky woods on the Rio Uaupès, *R. Spruce*, n. 2812.

3. C. LONGIFOLIA. Foliis longe obovali-oblongis glabris, floribus parvis glabris dense cymoso-glomeratis.—Folia ultrapedalia. Flores rameales. Petala 3–5 lin. longa.—*Mayna longifolia*, Poepp. et Endl. Nov. Gen. et Sp. iii. p. 64. t. 271.

Hab. Eastern Peru and Western Brazil. At the confluence of the Teffé and the Solimoes, in primitive woods, *Poeppig*; in shady mountains near Tarapoto, *Spruce*, n. 4255.

DENDROSTYLIS, *Karst.*

With much general resemblance to *Mayna*, especially in the male flowers, this genus differs in the female (or occasionally hermaphrodite) flowers, which, with three placentas, have three distinct styles, each one bifid with laciniate branches, and the fruit is said to be indehiscent. It bears long soft spines, like some species of Mayna. To this genus belong the *Mayna denticulata* (Benth. in 'Hook. Journ. Bot.' iv. p. 115), from British Guiana; the *M. echinata* (Spruce, Pl. Exs. n. 4070 and 4499), from North Brazil; and a New Granada species from Purdie; but whether they be identical with or distinct from any of the five described by Karsten in the 'Linnæa' (xxviii. p. 431), I have not been able as yet satisfactorily to ascertain.

RYANIA, *Vahl.*

This genus, consisting of five or six species from tropical America, chiefly from Guiana, was formerly placed near to *Lætia*, but has since been removed to Passifloraceæ, probably on account of a cupular disk surrounding the ovary in some species. This disk is not, however, to be compared with the corona of Passifloreæ, which is always outside the stamens; nor yet with the disk of *Lunania*, for it is decidedly hypogynous; and the general arrangement of the perianth and stamens appears to me to be much more that of Bixaceæ than of Passifloreæ. The æstivation of the sepals, much imbricate as in *Lætiæ* and its allies, is, however, slightly different in the mode of imbrication; for, as in Cistineæ, two sepals are outside and the three inner ones contorted. There are no petals, the stamens are hypogynous, the anthers elongated, as in Oncobeæ, whilst all other characters bring the genus into Lætieæ.

LÆTIA, *Linn.*

This genus, like *Prockia*, had long been a receptacle for miscellaneous polyandrous plants with parietal placentas, but has latterly

been better defined by Bennett, Clos, Grisebach and others, and is readily known by its very much imbricated, usually reflexed sepals without petals, short anthers, subulate entire style, and many-ovulated placentas. In two species the stamens are much fewer in number, and on the supposition that there were ten only, these plants were both referred by Poeppig to *Samyda*; and Grisebach, perceiving their discrepancy from the latter genus, proposes for their reception a new one under the name of *Casinga*, but without comparing them to *Lætia*. Sagot, however, has more correctly, in the sets of Cayenne plants he is distributing, labelled one of them as a new *Lætia*. I find in both of them the stamens varying in number from 10 to 15 or even more, and not uniseriate as in *Samyda* and its allies, nor yet so decidedly perigynous, although in all *Lætias* their insertion is somewhat ambiguous, between hypogynous and perigynous.

The fruit of the genus is described by Martius as an indehiscent berry, by Grisebach as having the pericarp drupaceous and dehiscent. I have seen it only in a few species, and then not always quite ripe. It appears, as in *Casearia*, to vary much in different species, in size as well as in succulence; in some it is decidedly 3-valved, at least at the top, in others it grows much larger and shows no sign of dehiscence. Two species have the bracts at the base of the pedicel united into a curious almost fleshy, truncate cup, which made me, in naming Spruce's plants, hesitate whether I should not consider them as a distinct genus; but I now find that a similar arrangement of the bracts is observable, though in a less degree, in several other Bixaceæ and Samydaceæ.

The following are the species hitherto published or known to me:—

* *Folia membranacea, sæpe punctata. Sepala corallina.*

1. L. THAMNIA, *Sw., Griseb. Fl. Brit. W. Ind.* p. 20.
Hab. West Indies.

2. L. APETALA, *Jacq., Mart. Nov. Gen. et Sp.* ii. p. 78. t. 165. Foliis ovato- v. obovato-oblongis obtusis, pedunculis subtrifloris, ovario glabro.
Hab. Tropical America.
To the localities given by Jacquin, Humboldt, and Martius, may be added, on the Rio Camude, in the province of Piauhy, Brazil, *Gardner*, n. 2312, judging from specimens in fruit only.

3. L. CORYMBULOSA, *R. Spruce, Pl. Exs.* n. 1599. Foliis oblongis ellipticisve acuminatis serrulatis membranaceis glabris, pedunculis 2–3-

chotome corymbosis, ovario glabro.—Habitus et folia *L. Thamniæ*; hæc vero angustiora, parce pellucido-punctata. Corymbi foliis 2–3-plo breviores, 8–20-flori. Flores albi, quam in *L. Thamnia* vix minores. Sepala vulgo 5, omnia petaloidea. Stylus stamina fere æquans, apice obtusus.

A small tree with the habit of a *Psidium*, gathered by Spruce in the gapò on the Solimoes in N. Brazil, in June 1851.

4?. L. FLORIBUNDA, *R. Spruce, Pl. Exs.* n. 1580.

This is probably a variety of the *L. corymbulosa,* with looser corymbs of smaller greenish flowers and broader leaves; but the specimens are scarcely sufficient to form a correct judgment. They were from a small tree in the gapò at Managuiri, near the confluenee of the Solimoes and the Rio Negro, gathered by Spruce in June 1851.

** *Folia coriacea impunctata. Sepala firmiora. Stamina numerosa.*

5?. L. LUCIDA, *Tul. in Ann. Sc. Nat. Par.* ser. 3. vii. p. 286.
Hab. Columbia.

I have not seen this plant, but from Tulasne's detailed description it would appear to differ from the two following species in the absence of the cupular bracts; and still more so, as indeed from the rest of the genus, in its placentas bearing 2 ovules only, and in its sessile stigma.

6. L. CUPULATA, *Spruce, Pl. Exs.* n. 3200. Foliis oblongis ellipticisve coriaceis nitidis, floribus fasciculatis, pedicellis basi bractea cupulata fultis et ea plus duplo longioribus.—Arbor parva (25-pedalis), ramis paucis elongatis. Folia 4–6-pollicaria, breve petiolata. Cupulæ subsessiles, crassæ, fere 2 lin. longæ. Sepala 4–6, carnea, utrinque tomentella, reflexa, circa 3 lin. longa. Stamina numerosissima, atropurpurea. Ovarium tomentosum. Ovula in placentis 10–12. Stylus glaber, elongatus, stigmate breviter 3-fido. Fructus ovoideus, crassocoriaceus, tomentosus, in valvulas 3 dehiscens. Semina non vidi.
Hab. In woods on the Casiquiare, above the mouth of the river Vasiva, in Venezuela; gathered by Spruce in December 1853.

7. L. CORIACEA, *R. Spruce, Pl. Exs.* n. 2730. Foliis oblongis acuminatis coriaceis nitidis, floribus fasciculatis, pedicellis basi bractea cupulata fultis et eam subæquantibus.—Folia quam in *L. cupulata* vulgo longiora, angustiora. Cupulæ floridæ in axillis arcte sessiles, paucæ, subglobosæ. Pedicelli brevissimi, tomentosi. Flores carnei, quam in *L. cupulata* minores; sepalis proportione latioribus. Fructus junior globosus, dense tomentosus. Cætera fere *L. cupulatæ*.
Hab. A small tree, seldom above 12 feet high, in the woods near Tomo, on the Guainia or Upper Rio Negro, in Venezuela, and near Panuré on the Rio Uaupès in N. Brazil *, *R. Spruce*.

* In some former papers in this Journal, I had, by mistake, mentioned the Rio Uaupès as being in Venezuela instead of N. Brazil.

*** *Folia nitida, subcoriacea. Stamina* 10–15.

8. L. SUAVEOLENS (Samyda suaveolens, *Poepp. et Endl. Nov. Gen. et Sp.* iii. p. 66. t. 274. Casinga suaveolens, *Griseb. Erläut. Pfl. Trop. Amer.* p. 27).—Stamina sæpius 10, rarius 11–12.

Hab. Frequent on the Amazon, the Solimoes, the Rio Negro, and Casiquiare, *Poeppig, R. Spruce,* n. 1451, 2756 and 3451; also in Cayenne, *Martin.*

9. L. CASEARIOIDES, *Sagot, Pl. Gui. Exs.* n. 1137. (Samyda procera, *Poepp. et Endl. l. c.* p. 67, ex descr.)

Hab. On the Amazon, *Poeppig*; French Guiana, *Sagot.*

Differs slightly from *L. suaveolens* in the leaves rounded at the base, the shorter styles, and the stamens occasionally as many as 15, or even more. Grisebach has shown that the supposed new *Lætias* of A. Richards' 'Flora Cubensis' are identical with his *Zuelania lætioides,* a species of *Thiodia* among Samydaceæ.

APHLOIA, *Benn.*

Clos proposes removing this Madagascar genus to Capparideæ on account of the curved embryo, without, as he supposes, any albumen. In the seeds that I have examined, however, I certainly find albumen, although in less quantity than in other Bixaceæ, and the other characters are all much more those of Bixaceæ than of Capparideæ.

With regard to the Mascarene or Asiatic genera *Ludia* and *Erythrospermum,* and the African *Rawsonia, Dovyalis, Aberia,* and *Trimeria,* I have nothing to add to what has been said by Clos in the above-mentioned paper, or by Harvey in his 'Flora Capensis.'

AZARA, *Ruiz et Pav.*

Clos takes this genus as the type of a tribe, joining with it *Banara, Kuhlia,* and *Pineda,* and Bennett had already suggested that *Pineda* might not be distinct from *Azara.* The calyx of the latter is, however, not valvate as in *Banara,* nor has it the sepaline petals of that genus. In most species the sepals are small, and long before the expansion of the flower no longer meet at the edges, but when they do, they slightly overlap. The stamens are also hypogynous, or but slightly and much less perigynous than in *Banara* (in which we include *Kuhlia* and *Pineda*). Altogether, *Azara* appears to me to be nearly allied to *Scolopia* in habit as well as in character, differing chiefly in the want of petals and of the appendage to the connectivum of the anthers.

We have no new species to add to the genus; and one of those already published (*A. microphylla,* Hook. fil.) is very anomalous,

having only 5 stamens alternating with the sepals, and as many glands opposite the sepals as in Homalieæ; but the habit and other characters are so much those of *Azara*, that we feel scarcely justified in proposing it as a distinct genus, unless the differences be continued through other species.

SCOLOPIA, *Schreb.*

Clos has shown sufficient reason for adopting Schreber's earlier name of *Scolopia* in lieu of *Phoberos* of Loureiro, which has been more frequently in use. The genus is well characterized, and we have probably about 15 species in our herbaria, including several unpublished Australian ones; but several of those enumerated by Clos require revision. The genus is unrepresented in America.

FLACOURTIA, *Lhér.*, and XYLOSMA, *Forst.*

The Asiatic *Flacourtias*, the American *Flacourtias* or *Hisingeras*, and the Pacific *Xylosmas*, are all so closely allied that no character whatever has been pointed out in the male individuals by which they can be generically separated. In the females, however, the true Asiatic *Flacourtias* have, in the structure of their completely several-celled ovary, so anomalous in the Order, and in the bony endocarp separating the ripe seeds, too positive a distinction to be neglected, and must now be admitted as a well-established genus. Clos thought, also, that he found in the styles and stigmas sufficient to separate the *Hisingeras* or American *Flacourtias* of previous authors from *Xylosma*. Asa Gray has, however, shown that this character completely breaks down, especially in the Japanese species; and Grisebach has followed his example, in referring all the *Hisingeras* to *Xylosma*. In further confirmation of the correctness of this view, we may state that the *Flacourtia chinensis*, Clos, and *Hisingera japonica*, Sieb. and Zucc., appear to be specifically identical. Considering the two genera as thus limited, 18 species of *Flacourtia* and 27 of *Xylosma* (including *Hisingera*) have been enumerated by Clos. Grisebach reduces, however, to *Xylosma nitidum* at least six of Clos's *Hisingeras*. It is possible that a careful monographist might not go quite so far in this amalgamation; yet as far as we can judge from a hasty inspection, we think that the fairest estimate of the number of species of the two genera more or less known or deposited in our herbaria, is about 12 for *Flacourtia* and about 25 for *Xylosma*.

BENNETTIA, *Miq.*

We may hope that this genus, dedicated to our distinguished friend who so long devoted to us his valuable services as Secretary, may meet with a better fate than those previously named in his honour (*Bennettia*, S. W. Gray, is *Saussurea*, DC., and *Bennettia*, R. Br., proves to be *Galearia*, Blume). The new genus is founded by Miquel on a single Javanese species, and is allied to *Flacourtia* and *Xylosma*; and although the fruit is as yet imperfectly known, it may be maintained as distinct, on account of the 3-merous calyx, and the peculiar stipitate glands (perhaps staminodia) which cover the disk surrounding the ovary in the female flowers; for these characters are accompanied by a different habit, arising chiefly from the paniculate inflorescence.

The SAMYDACEÆ, as we have above proposed to extend them, being composed of genera usually distributed into three different orders, will naturally be divided into as many tribes, which we may call *Casearieæ*, *Banareæ*, and *Homalieæ*. To these it is probable that *Turnereæ* may be added as a fourth tribe; but the limits of the Order, on the side of Calycifloræ, cannot be determined until the whole of the parietose Orders of that class shall have been worked up and compared with the exceptionally parietose genera in Saxifragaceæ and other Orders where the placentation is normally axile. As far as concerns the genera which have more or less connexion with Bixaceæ, and which we have hitherto examined or studied, I should include the following among Samydaceæ:—

Tribus I. CASEARIEÆ. Calyx liber, 4–5-merus. Petala 0. Stamina 6–30, simplici serie tubo calycis inserta, interjectis sæpe in eadem serie squamis seu staminodiis totidem.

* *Squamæ seu staminodia staminibus interjecta, libera v. in cupulam connata.*

Genera:—1. Thiodia, *Benn.* (Zuelania, *Rich.*) 2. Casearia, *Linn.* (Valentinia, *Sw.* Guidonia, *Griseb.*) 3. Osmelia, *Thw.* (Stachycrater, *Turcz.*) 4. Lunania, *Hook.* 5. Euceræa, *Mart.*

** *Squamæ seu staminodia* 0.

Genera:—6. Sadymia, *Griseb.* 7. Samyda, *Linn.*

Tribus II. BANAREÆ. Calyx liber, 4–5-merus. Petala tot quot sepala. Stamina numerosa pluriseriata, disco perigyno inserta.

Genus:—8. Banara, *Aubl.* (Kuhlia, *H. P. et K.* Pineda, *R. et P.* Christannia, *Presl.* Ascra, *Schott.*)

Tribus III. HOMALIEÆ. Calyx liber v. basi ovario adnatus, 4–15-merus. Petala tot quot sepala v. rarius numero dupla. Stamina petalis numero æqualia v. plura, singulatim v. fasciculatim iis opposita, cum glandulis pulvinatis sepalis oppositis alternantia.

* *Ovarium superum.*

Genera:—9. Calantica, *Tul.* 10. Bivinia, *Tul.* 11. Dissomeria, *Benth.*

** *Ovarium semi-inferum.*

Genera:—12. Homalium, *Jacq.* (Blackwellia, *Comm.*) 13. Byrsanthus, *Guillem.*

With the exception of *Osmelia*, *Lunania*, and *Banara*, I have, for the present, but few remarks to offer on these genera. For *Thiodia*, *Sadymia*, and *Samyda*, I may refer to Grisebach's 'Erläuterungen' above mentioned. The large genus *Casearia* is much in need of a careful monographist, for some of the common species have been repeated by various authors under several different names. I see no reason for modifying the five sections into which I proposed to divide it in the 4th vol. of 'Hooker's Journal of Botany.' Grisebach has indeed well identified *Valentinia*, Sw., with the section *Hexanthera*, Endl., and my *Casearia brevipes* with *Lætia guidonia*, Sw., both of which he proposes to establish as distinct monotypic genera; but I can scarcely concur in the reasons which he gives. In *Valentinia* there appears to be nothing but the prickly-toothed leaves to rely upon. In *Guidonia* the scales or staminodia are very short, and slightly united outside the filaments, so that the stamens appear to be inserted within the notches of a short crenulated tube; yet it appears to me that this cannot be considered as a structural difference, nor as the character of a group of species, but merely as a difference in degree, exemplified in a single one which has otherwise the habit and characters of the *Iroucanas*.

Osmelia, Thw., from Ceylon, has the perianth, stamens and ovary of *Casearia*, but the styles are short and free from the base; and this character being accompanied by a very marked difference in inflorescence, and confirmed in two other species from the Philippine Islands, may be considered as amply sufficient for establishing a generic group. One of the latter species has been published by Turczaninow under the name of *Stachycrater*, too nearly after the appearance of the first part of Thwaites' 'Enumeration of Ceylon Plants' for him to have been aware of the

Osmelia being there described; yet the latter name has undoubtedly the right of priority. The three species may be distinguished as follows:—

1. O. PHILIPPINENSIS. Foliis (4–6-pollicaribus) longiuscule petiolatis basi acutatis 3-nerviis, racemis gracilibus axillaribus subramosis, floribus 4-fidis 8-antheris.—*Stachycrater philippensis*, Turczan. Bull. Mosq. 1859.

Hab. Philippine Islands, *Cuming*, n. 1685.

2. O. CONFERTA. Foliis (4–5-pollicaribus) brevius petiolatis basi rotundatis penninerviis v. irregulariter 3-nerviis, racemis axillaribus subramosis folio brevioribus, floribus 4-fidis 10-antheris.—Flores quam in præcedente majores confertiores. Sepala linea sublongiora, late orbiculata.

Hab. Philippine Islands, *Cuming*, n. 1741.

I opened six flowers, in all of which I found the 10 stamens and staminodia, with only 4 sepals, as in some Casearias.

3. O. GARDNERI, *Thw. Enum. Pl. Zeyl.* p. 20. Foliis (2–4-pollicaribus) basi acutatis penniveniis, racemis elongatis in panicula terminali divaricatis, floribus 5-fidis 10-antheris.

Hab. Ceylon, *Gardner*, n. 193, *Thwaites*, n. 1246.

LUNANIA, *Hook.*

Placed hitherto among Bixaceæ, this genus offered several remarkable anomalies, especially in the definite stamens inserted on a cupular disk, which appeared to have nothing analogous in the Order. The additional species, however, now known fully explain the nature of this disk, showing that it is formed of the union of the scales or staminodia of Samydeæ, and that *Lunania* is in fact closely allied to *Osmelia*, of which it has also the habit and inflorescence. The chief generic distinction consists in the calyx, which, as in some Pangieæ, is quite entire and globular before flowering, and then divides into 2, or rarely 3, broad concave valvate sepals. The union of the staminodia with the base of the stamens in a cupular or shortly tubular disk, occurs also, as already observed, in *Casearia guidonia* (*C. brevipes*, Benth.; *Guidonia spinescens*, Griseb.); but in that species the stamens appear to be inserted slightly within its crenatures, whilst in *Lunania* they are rather external. In *Lunania divaricata* the disk-lobes and stamens are almost as much in a single series as in *Osmelia*.

The following are the species of *Lunania* now known:—

1. L. Grayi, *Griseb. Erläut. Pfl. Trop.* p. 26. Foliis a basi 3-nerviis obtusis (1½–3-pollicaribus) basi subacutis, pedicellis plerisque flore longioribus, staminibus sæpius 6, disco truncato.

Hab. Cuba, *Linden*, n. 2130; *Wright*, n. 464 and 1110.

Linden's plant was, by mistake, referred by Grisebach, in the 'Flora of the British West Indies,' to the *L. racemosa*, but he had not yet, at that time, distinguished the two species.

2. L. racemosa, *Hook. Lond. Journ. Bot.* iii. p. 317. t. 11 et 12. Foliis 3–5-plinerviis acuminatis (3–5-pollicaribus) basi truncatis cordatisve, pedicellis flore raro longioribus, staminibus sæpius 6, disci dentibus acutis glabris.

Hab. Jamaica, *Purdie, Wilson.*

3. L. parviflora, *Spruce*, sp. n. Foliis a basi 3–5-nerviis acuminatis (4–5-pollicaribus) basi obtusis rotundatisve, pedicellis brevissimis, staminibus sæpius 10, disci lobis obtusis ciliatis.—Arbor tenuis, 18-pedalis, ramulis subpendulis, tota glabra. Folia abrupte acuminata, integerrima, fere *L. racemosæ*, nervis tamen lateralibus basi a costa distinctis. Racemi longi, lineares. Flores quam in *L. racemosa* multo minores et fere sessiles. Perianthium per anthesin in lobos 2, rarius 3, primum reflexos, mox circumscisse deciduos divisum. Stamina fere semper 10, filamentis brevissimis; antheræ ut in cæteris speciebus oblongæ in flore modo apertæ arcte conniventes et stricte extrorsæ. Discus crassiusculus breviter cupulatus, lobis brevibus latis obtusis ciliolatis. Stylus brevis, conicus, obtusus, demum sæpe tripartitus fere *Osmeliæ*.

Hab. In young woods on the Yurimaguas, province of Maynas, Western Brazil, *R. Spruce*, n. 3909.

4. L. divaricata, sp. n. Foliis a basi 3–5-nerviis acuminatis (2–3-pollicaribus) coriaceis basi acutiusculis, pedicellis brevissimis, staminibus 6–8 cum disci segmentis truncatis alternantibus.—Ramuli in specimine breves, valde divaricati, ad nodos incrassati. Folia quoad formam iis *L. parvifloræ* subsimilia sed multo minora, magis coriacea, in sicco pallida et basi plus minus angustata. Petioli subsemipollicares, apice incrassati et inflexi. Racemi minute tomentelli, tenues, 2–3-pollicares, per 3–5 in paniculas valde divaricatas dispositi. Flores fere sessiles, quam in *L. parviflora* adhuc minores. Calyx in sepala 2 reflexa rumpens. Stamina sæpius 6, sed etiam 7 et 8 enumeravi. Discus fere ad basin divisus in segmenta totidem orbiculato-truncata.

Hab. Cuba, *Wright*, n. 1563.

Banara, *Aubl.*

It is now admitted that *Ascra*, Schott, and *Boca*, Vell., are generically the same as *Banara*, and Clos has brought in close juxtaposition *Kuhlia*, H. B. et K., and *Pineda*, Ruiz and Pav. (*Christannia*, Presl). He might have gone further and absolutely united

them; for the supposed distinctive characters have only arisen from differences in the manner of describing them, not in the characters themselves. One, indeed, of the original *Kuhlias* may not be specifically distinct from Aublet's *Banara*, and other species have been referred by one author to *Kuhlia*, and by another to *Banara*, with equal correctness. I cannot, however, by any means concur with Grisebach in uniting *Banara* with *Prockia*. The latter genus differs essentially in its hypogynous stamens and completely several-celled ovary, and I have no hesitation in following Clos, who refers it to Tiliaceæ. I have had occasion to revert to it in some notes on the latter Order which precede the present paper.

I am unable at present to give a good diagnostic synopsis of the genus, for want of authentic specimens of some of the published species. When better known, it is probable that the 15 comprised in the following enumeration may be reduced to 14, 13, or perhaps to 12 only.

§ 1. *Flores paniculati. Sepala irregulariter valvata, sæpe jam ante anthesin aperta petala ostendentia v. cum iis subimbricata.*

1. B. PARVIFLORA. (Kuhlia parviflora, *A. Gray, Bot. Amer. Expl. Exped.* i. p. 73.)

Hab. Organ Mountains near Rio Janeiro, *American Exploring Expedition.*

2. B. TOMENTOSA, *Clos in Ann. Sc. Nat. Par.* ser. 4, viii. p. 240.

Hab. Brazil, province of Rio Grande do Sul, *Herb. Par.*, quoted by Clos.

The above two species, of neither of which have I seen authentic specimens, must, from their descriptions, be closely allied to each other, if not identical. Some specimens of Tweedie's in the Hookerian herbarium, from Rio Grande do Sul, may be the same as Clos's plant, but they are quite glabrous, even on the calyx. The flowers are the smallest in the genus.

3. B. ULMIFOLIA. (Kuhlia ulmifolia, *H. B. et K. Nov. Gen. et Sp.* vii. p. 237. t. 653.)

Hab. New Grenada, in the Andes of Popayan, *Humboldt & Bonpland*; in the province of Antioquia, *Triana.*

The flowers, rather larger than in Tweedie's plant, are still much smaller than in all the following species.

4. B. LAXIFLORA, sp. n. Glabra, foliis petiolatis elliptico- v. obovali-oblongis acuminatis basi angustatis et trinerviis, paniculis laxe divaricatis folia subæquantibus.—Arbor tenuis, 18-pedalis, ramis patulis. Folia 4–7-poll. longa, leviter sinuato-dentata, basi sæpius acuta, mem-

branacea, impunctata; petiolo 4–8 lin. longo. Paniculæ axillares; ramis bis, ter, quaterve 3–4-nis gracilibus, divaricatis. Pedicelli graciles, calyce longiores. Sepala sæpius 3, ovata, acuta, 1 lin. longa, nunc in alabastro petala valvatim includentia, nunc sæpius jam ante anthesin plus minus aperta et cum petalis imbricata. Petala sepalis æquilonga, obtusa, imbricata, extus puberula, cum sepalis per anthesin reflexa. Stamina perigyna, ultra 30; filamentis filiformibus, flexuosis; antheris subglobosis. Ovarium glabrum, basi attenuatum; placentæ 2 (v. 3?), valde prominentes, infra medium septum completum formantes, superne ad axin liberæ. Stylus brevis, integer. Bacca globosa.

Hab. Western Brazil and Eastern Peru, frequent on the banks of the Marañon and Pastasa, *R. Spruce*, n. 4964.

5. B. PUBESCENS, *Spruce*, sp. n. Molliter pubescenti-hirta, foliis brevissime petiolatis ovali-oblongis acuminatis serratis basi rotundatis subcordatisve penninerviis paniculis axillaribus folio brevioribus.—Arbor 40-pedalis, dense ramosa ligno duro. Folia 4–5-pollicaria, serraturis glanduliferis, sæpe obliqua, supra demum asperula, subtus molliter pubescentia; glandula utrinque ad petiolum brevem v. ad basin laminæ. Paniculæ axillares 1–3-pollicares, laxiuscule trichotomæ v. sæpius irregulariter ramosæ, pubescentes. Sepala 2 lin. longa, in alabastro plus minus aperta, v. rarius hinc inde valvatim clausa. Petala paulo majora, imbricata, extus puberula, per anthesin patentia at non reflexa. Stamina fere 100, perigyna; filamentis filiformibus, antheris subglobosis. Ovarii placentæ in flore examinato 6, fere ad medium cavitatis prominentes; ovulis parvis, numerosis, pluriseriatis. Stylus breviter subulatus, integer.

Hab. Eastern Peru (or Ecuador?), in woods at Pallatanga, *R. Spruce*, n. 5528.

The flowers, according to Spruce, have the scent of our common lime tree.

§ 2. *Flores pyramidato-paniculatæ. Sepala strictius valvata, petala in alabastro includentia.*

6. B. GLAUCA (Kuhlia glauca, *H. B. et K., Nov. Gen. et Sp.* vii. p. 236. t. 652).

Hab. New Grenada, *Humboldt & Bonpland.*

I have seen no authentic specimen of this species, but from Kunth's figure and description it must be very closely allied to, if not identical with, the *B. guianensis.*

7. B. GUIANENSIS, *Aubl., Clos in Ann. Sc. Nat.* ser. 4, viii. p. 259, with the synonyms adduced. (*B. mollis*, Tul., Clos, *l. c.* with the synonyms. *Trilix glandulosus*, Griseb. Fl. Brit. W. Ind. p. 22.)

Hab. Widely spread over tropical America. We have specimens from

Panama, Trinidad, Guiana, Surinam, *Hostmann*, n. 495; Cayenne, New Grenada, Tropical Brazil, *Gardner*, n. 1451; Peru, *Ruiz & Pavon*, &c.

Spruce's n. 4894, from Tarapoto, may be a variety of this species, but it is remarkable for the large panicles of flowers much smaller than usual.

8. B. VELLOSII, *Gardner in Hook. Lond. Journ. Bot.* ii. p. 331. (Boca serrata, *Vell. Fl. Flum.* v. t. 113.)

Hab. Brazil, near Rio Janeiro, *Gardner*, n. 310.

I have considerable doubts whether this is more than a variety of *B. guianensis*.

9. B. IBAGUENSIS, *Tul. in Ann. Sc. Nat. Par.* ser. 3, vii. p. 290.

Hab. Near Ibague in New Grenada, *Goudot.*

United by Grisebach with *B. guianensis*, it appears to me to differ in several points. It is readily recognized by its sessile flowers.

10. B. BRASILIENSIS (Kuhlia brasiliensis, *A. Gray, Bot. Amer. Exp. Exped.* i. p. 73. Ascra brasiliensis, *Schott in Spreng. Syst. Cur. Post.* p. 407).

Hab. Brazil, province of Rio Janeiro, *Schott.*

This is referred by Clos to the *B. Vellosii*; but it appears to be quite distinct in the more coriaceous leaves narrowed into a longer petiole, the smaller flowers, &c.

11. B. MEXICANA, *A. Gray, Pl. Ervendb.*

Hab. Wurtenberg, near Tantoyuca, province of Huasteco, Mexico, *L. C. Ervendberg.*

This species is fully described by Asa Gray in an enumeration of Ervendberg's plants, now in the press.

12. B. NITIDA, *Spruce*, sp. n. Foliis ovali-oblongis acuminatis glabris nitidis penninerviis, panicula ramosa tenuiter canescente.—Arbor patula, 40-pedalis. Folia 4–6-pollicaria, obtuse et remote dentata, basi obliqua, supra ad petiolum brevem glandula scutellata aucta. Panicula laxa. Flores pedicellati, flavo-virides. Petala et sepala 1 lin. longa. Capsula globosa, glabra, indehiscens, 4 lin. diametro.

Hab. Along streams near Tarapoto, in Eastern Peru, *R. Spruce*, n. 4512.

§ 3. *Flores ad apices ramorum v. rarius ad axillas breviter simpliciterque racemosi v. fasciculati.*

13. B. GRANDIFLORA, *Spruce*, sp. n. Foliis ovali-ellipticis 3-nerviis glabris, floribus in spica terminali paucis dissitis sessilibus.—Arbor parva, vage ramosa, 20-pedalis. Folia 4–6-pollicaria, remote calloso-dentata, subcoriacea, usque ad apicem trinervia; glandulis nullis nisi ad dentes marginales. Spica interrupta, 2–3-pollicaris. Flores pauci quam in cæteris speciebus majores. Sepala valvata et petala imbri-

cata persistentia, incano-tomentosa, in fructu conniventia, 5 lin. longa. Bacca sicca, placentis 5 in cavitate valde prominentibus.

Hab. Among rocks along streams near Tarapoto, in Eastern Peru, *R. Spruce*, n. 4897.

14. B. INCANA. Foliis (subpollicaribus) oblongis denticulatis obtusiusculis penninerviis utrinque incanis, floribus longiuscule pedicellatis in racemo abbreviato paucis.—*Pineda incana*, Ruiz et Pav. Prod. Fl. Per. et Chil. p. 76. *Christannia salicifolia*, Presl Rel. Hænk. ii. p. 91. t. 67.

Hab. Peru, *Ruiz* and *Pavon*; in the mountains of Huanuco, *Hænke*; near San Rafael, *Matthews*, n. 891.

Var.? *Jamesoni.* Foliis crassioribus glabris siccitate nigricantibus, venis præter costam inconspicuis, pedicellis parum brevioribus. Foliorum forma et flores incano-tomentosi omnino *B. incanæ*.

Hab. Ecuador, near Oña, and between Cuenca and Loxa, *Jameson.*

I have only seen two small specimens, and cannot therefore judge of the constancy of the characters derived from the leaves. Jameson describes it as a small tree. *B. incana* is said to be a shrub.

15. B. DIOICA, sp. n. Foliis elliptico-oblongis lanceolatisve acuminatis remote dentatis 3-nerviis subcoriaceis glabris v. subtus pubescentibus, floribus dioicis in racemo abbreviato 2–4.—Folia 2–3-pollicaria. Racemi folio breviores, terminales, tomentosi, rhachi brevissimo; pedicellis 3–4 lin. longis. Sepala 3, valvata, ovata, 2 lin. longa, tomentosa. Petala majora, imbricata, extus glabriuscula, intus sericeo-tomentosa. Stamina numerosissima. Stylus simplex. Placentæ 3.

Hab. Near Vera Cruz, Mexico, *Linden*, n. 31; *Galeotti*, n. 7019.

16. B. DOMINGENSIS, sp. n. Foliis ovatis obtusis subtrinerviis coriaceis subtus scabro-puberulis, pedicellis in racemo brevissimo paucis, floribus hermaphroditis.—Folia 2–3-pollicaria, sæpius late ovata, remote glanduloso-denticulata; petiolo brevi. Pedicelli ad axillas foliorum vetustiorum v. ad nodos defloratos 2–5-ni, singuli 3–5 lin. longi, uniflori, puberuli. Sepala 3–4, late ovata, valvata, coriacea, extus tomentella. Petala totidem paulo tenuiora et longiora, imbricata, extus tomentella et cum sepalis persistentia. Stylus stamina æquans. Placentæ 3, ovulis pluriseriatis.

Hab. St. Domingo, *Schomburgk*, n. 79.

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ERRATA.

For *Piplostylis*, read throughout *Piptostylis*.

For *Casimaroa*, read throughout *Casimiroa*.

THE END.

Printed by Taylor and Francis, Red Lion Court, Fleet Street.

Hibiscus Welshii. T. Anders.

W. Fitch del et lith.

A. Sterculia Arabica, T. Anders   B. S. Abyssinica. R. Br.

Saltia papposa, *Moq.*

Euphorbia cuneata, *Vahl.*

Euphorbia systyla, *Edgew.*

Jatropha spinosa, *Vahl.*